

THE PSEUDOCOCCIDAE (HOM. : COCCOIDEA)  
DESCRIBED BY C. K. BRAIN  
FROM SOUTH AFRICA

BY

G. DE LOTTO

Department of Agriculture, Kenya *xnf.*

*Pp. 77-120 ; 19 Text-figures*

BULLETIN OF  
THE BRITISH MUSEUM (NATURAL HISTORY)  
ENTOMOLOGY Vol. 7 No. 3  
LONDON : 1958

THE BULLETIN OF THE BRITISH MUSEUM  
(NATURAL HISTORY), *instituted in 1949, is  
issued in five series corresponding to the Departments  
of the Museum, and an Historical Series.*

*Parts appear at irregular intervals as they become  
ready. Volumes will contain about three or four  
hundred pages, and will not necessarily be completed  
within one calendar year.*

*This paper is Vol. 7, No. 3 of the Entomological  
series.*

© Trustees of the British Museum. 1958



PRINTED BY ORDER OF THE TRUSTEES OF  
THE BRITISH MUSEUM

*Issued August, 1958*

*Price Twelve Shillings and Sixpence*

THE PSEUDOCOCCIDAE (HOM. : COCCOIDEA)  
DESCRIBED BY C. K. BRAIN  
FROM SOUTH AFRICA

By G. DE LOTTO

Department of Agriculture, Kenya

OUR knowledge in the Pseudococcid fauna of South Africa is almost entirely based on the works published by C. K. Brain, who treated altogether forty-two species and varieties, thirty-one of which were described by him as new. Omitting any criticism of the methods he used in all his descriptions, which are more or less of the standard then attained by the majority of entomologists, it is evident that none of his species can be recognized without the examination of the types. Subsequent workers dealt with a few of his species, but those remaining were still completely unrecognizable.

In the present paper all Brain's species are reviewed or redescribed from the types, paratypes or specimens which, although marked by the serial number only, undoubtedly belonged to the original material studied by him. The main work was carried out at the Division of Entomology of the Department of Agriculture in Pretoria, where the bulk of Brain's collection is deposited. Material of four species apparently missing there, was made available from the U.S. National Collection of Coccidae in Washington, D.C.

With a few exceptions the original material examined was in poor and at times in very poor condition. Specimens were often broken and badly distorted and not cleaned or not properly cleaned of the body content. Furthermore some specimens were evidently mounted from dry material or overboiled when treated with KOH, so that when remounting we found very serious difficulties on making really adequate microscope preparations. The utmost care was made in studying every structure of taxonomic value in order to present adequate diagnoses and figures so as to enable the recognition of the various species and serve for their generic allocation in the final revision.

Out of twenty-nine species and two varieties described as new by Brain, three species and one variety have been already synonymized by various authors. Four more species and one variety are synonymized in the course of the following pages. The complete list of them is as follows :

- |                                |                               |
|--------------------------------|-------------------------------|
| <i>Antonina transvaalensis</i> | = <i>natalensis</i> Brain.    |
| <i>Pseudococcus capensis</i>   | = <i>maritimus</i> (Ehrhorn). |

<i>Pseudococcus citri phenacocciiformis</i>	= <i>citri</i> (Risso).
<i>Pseudococcus elisabethae</i>	= <i>quaesitus</i> Brain.
<i>Pseudococcus natalensis</i>	= <i>graminis</i> (Maskell).
<i>Pseudococcus segnis tylococciiformis</i>	= <i>segnis</i> Brain.
<i>Pseudococcus solitarius</i>	= <i>vastator</i> (Maskell).
<i>Pseudococcus trichiliae</i>	= <i>quaesitus</i> Brain.
<i>Rhizoecus africanus</i>	= <i>falcifer</i> Kuenckel.

With the publication of this paper nearly two thirds of the described mealy-bugs of the African continent south of Sahara have been dealt with.

### *Antonina natalensis* Brain

(Text-fig. 1)

*Antonina natalensis* Brain, 1915, *Trans. roy Soc. S. Africa*. **5** : 86.

*Antonina transvaalensis* Brain, 1915, *Trans. roy. Soc. S. Afr.* **5** : 87 (SYN. NOV.).

*Antonina indica panica* Hall, 1925, *Bull. Minist. Agric. Egypt.* **64** : 6 (SYN. NOV.).

*Antonina indica panica* Hall, 1937, *Trans. R. ent. Soc. Lond.* **86** : 125.

One slide with a single very adult female was available from the U.S. National Collection of Coccidae, Washington, D.C. It was labelled: "*Antonina natalensis* Br.; grass; Pietermaritzburg, Nov. 15, 1914; Chas. K. Brain; 33, C.K.B." The specimen was in fair condition, although the body skin was slightly chitinized and there were difficulties in examining some glandular structures.

"Adult female enclosed in a dense, though, felted sac at the base of grasses. Ovisac: at first sight the ovisacs appear spherical, but on closer inspection they are found to be somewhat produced at the anterior end, so as to be really pear-shaped, 4.5 mm. long and 3.8 to 4 mm. broad. In colour the sac is yellowish-white to buff. Adult female: purplish-black in colour, about 4 mm. long, distinctly semipyiform, being flattened ventrally and broadly rounded behind while the anterior end is narrowed. There is not secretory covering, but the walls of the sac are closely adherent to the body of insect." (Brain, *l.c.*) Body of mounted specimen broadly oval with posterior end chitinized. Anal and marginal cerarii entirely absent. Anal ring with six robust setae, set at inner extremity of a deep invagination of dermis. Multilocular disc pores numerous on median and submedian areas of venter and a few crowded near each stigmatic opening. Tubular ducts with inner end dome-shaped; they are fairly abundant and uniformly distributed on either side of body. Sieve-like pores caudad of posterior stigmatic opening lacking, apparently being replaced by flat circular glands with a granulated surface, variable in size and always smaller than multilocular disc pores. Trilocular pores evenly scattered on dorsum and venter. Very small invaginations of ventral dermis mark the position where the legs would be situated. Body setae very short, except a few on posterior end of body. Atrium of each stigmatic opening with a band of trilocular pores. Antennae formed by two or three small joints, with a tuft of short setae on apex.

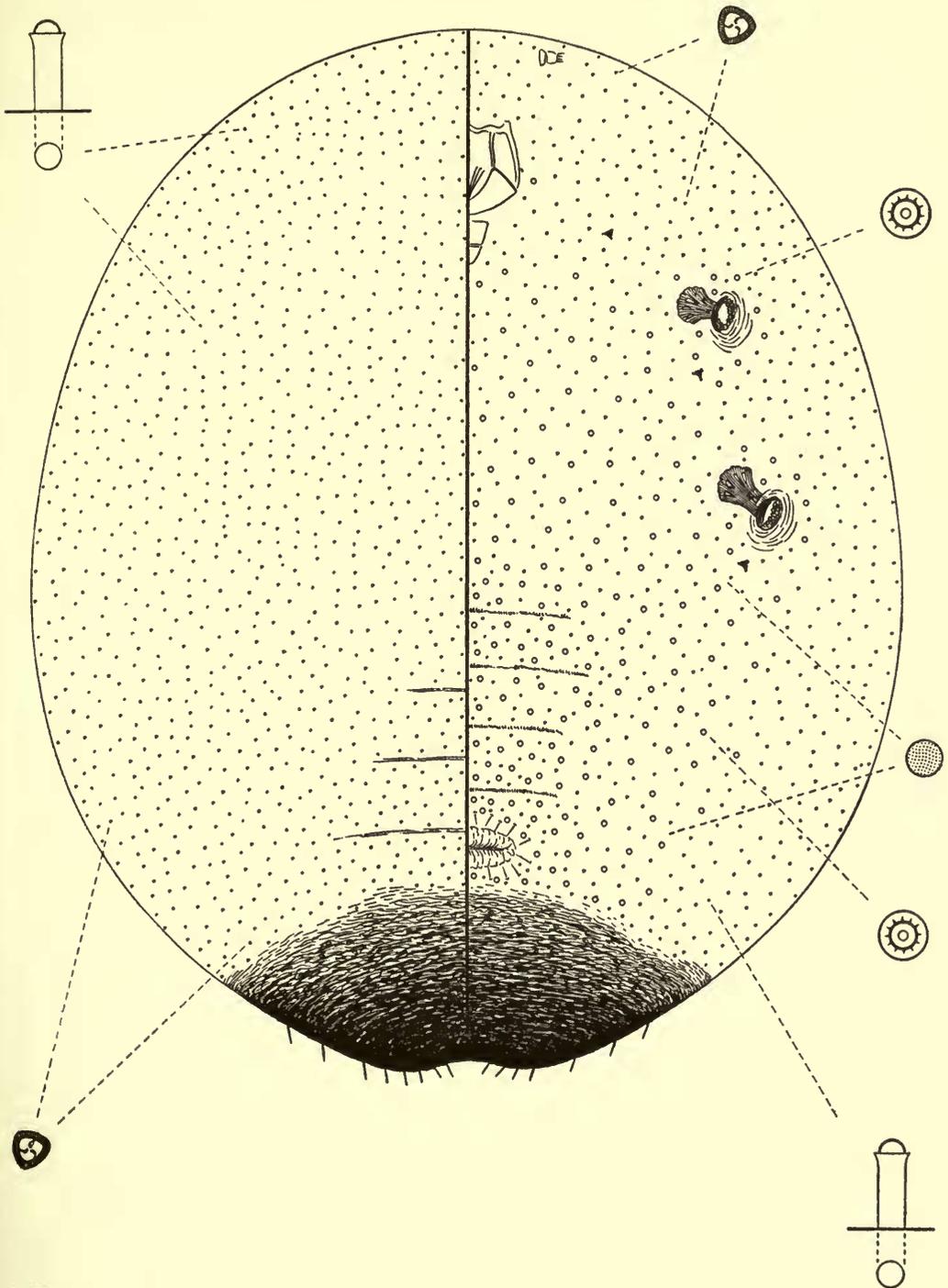


FIG. 1. *Antonina natalensis* Brain

*Antonina transvaalensis* Brain (= *Antonina natalensis* Brain)

*Antonina transvaalensis* Brain, 1915, *Trans. roy Soc. S. Afr.* 5 : 87.

One slide on loan from the U.S. National Collection of Coccidae, Washington, D.C., was seen. It contained three adult females, the last abdominal segments of another adult female and one larva. It bore the following label: "*Antonina transvaalensis* Brain; on roots of grass; Daspoort, Pretoria; C. K. Brain coll., Oct. 11, 1939; Brain II 70; 70, C.K.B." The mistake in the year of collection is evidently due to a pen slip. Very likely this slide, as many others in Brain's collection in Pretoria, was originally marked with the serial number only, and the label was written much later.

*Antonina transvaalensis* is a synonym of *natalensis* as no structural differences were found between the two species.

*Grewiacoccus gregalis* Brain

(Text-fig. 2)

*Grewiacoccus gregalis* Brain, 1918, *Bull. ent. Res.* 9 : 108.

The material examined was represented by five slides each containing a single adult female in fairly good condition, except that the prosoma was partly distorted. All slides were labelled: "*Grewiacoccus gregalis*; Transvaal, Pienaar's River, 23 January 1917; C.K.B. and C. Fuller; on leaves of kruisbesje<sup>1</sup>; C.K.B. 305."

"Adult female causing a gall on the leaf of the host-plant, in which one, two or three insects may be present. The galls may be solitary, or, as is often the case, five to twelve may be found clustered around the edge of a single leaf. The mature gall is about 6 mm. in length, broadly inflated, with the sides tapering slightly to the neck, of a scrotal shape or one very much like a pitcher. The galls stand nearly erect from the distorted edge, and are of the same green colour and texture as the leaf. There is no hole at the distal end, but below, on the under-side of the leaf, is a circular opening through which project two dense white filaments accompanied by a small amount of fine white cottony matter. When obtained in January numerous young were found clustered around the necks of some of the galls. All the available space in the gall is occupied by the female—or females if these are two or three—and on the inner walls there is a slight layer of white wax, which is more plentiful near the base, or where the posterior part of the insect is. . . . Adult female when alive, yellowish or slight pink, about 3.2 mm. long." (Brain, *l.c.*) Mounted specimens broadly oboval, tapering posteriorly with dorsal dermis of postsoma very slightly chitinized at maturity. Anal and marginal cerarii absent. Anal lobes each provided on ventral side with a short stout seta. Multilocular disc pores absent. Tubular ducts very short with chitinized walls; inner end membranous, dome-shaped. They occur on both sides of body and are more numerous on last abdominal segments. Trilocular pores distributed on either side of body; a few crowded near each stigmatic opening. Circular disc pores lacking. Posterior dorsal ostioles rather prominent, with lips

<sup>1</sup> Afrikaans name of *Grewia occidentalis* L.

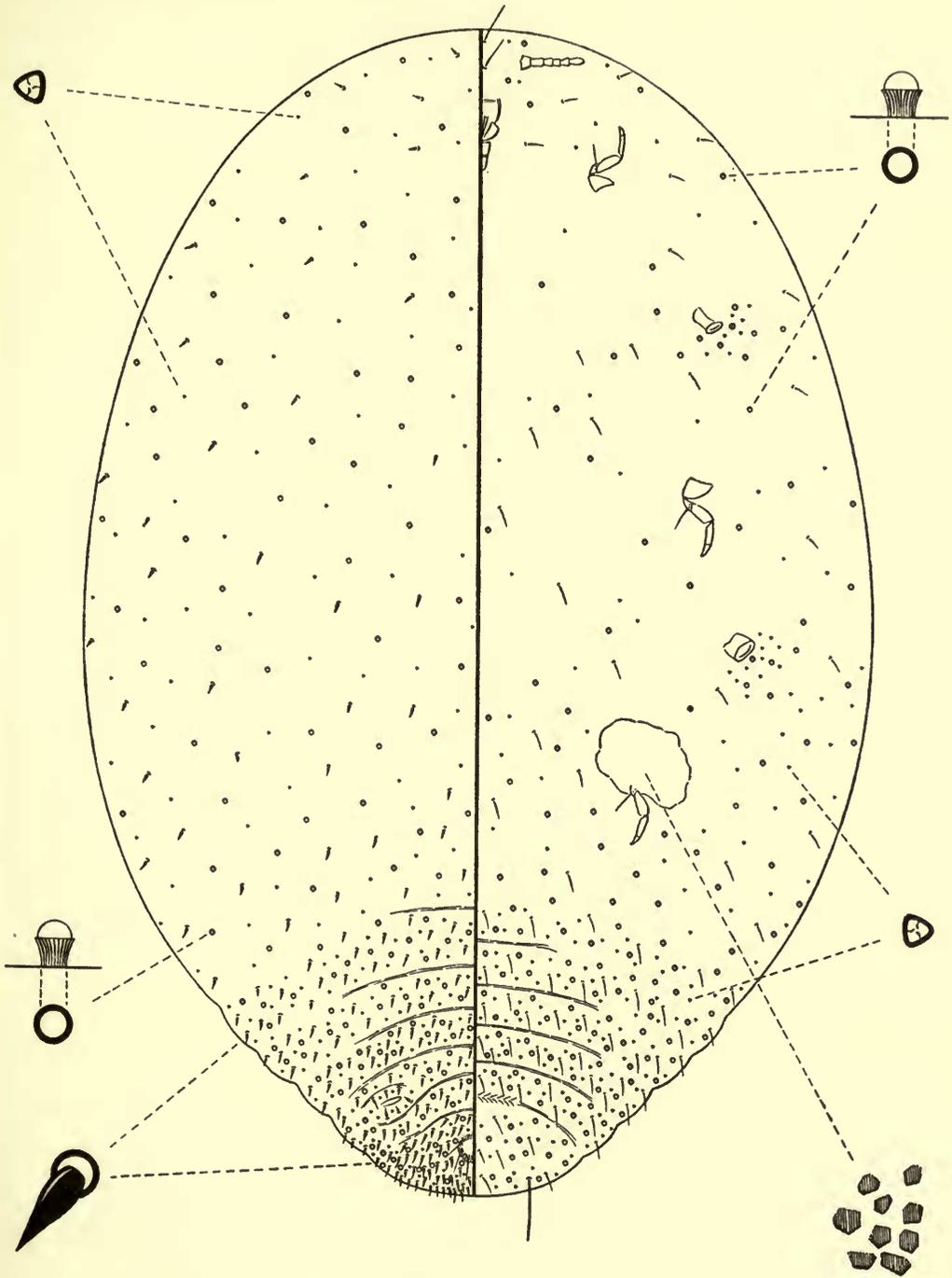


FIG. 2. *Grewiaccoccus gregalis* Brain

membranous; anterior ones not recognizable. Circulus absent. Legs small; hind coxae broadly enlarged forming an irregularly shaped plate marked by numerous small and slightly chitinized areas. Numerous short stoutly lanceolate setae arranged dorsally all around anal ring; on preceding segments they tend to be fewer and smaller; on prosoma they are still more widely scattered. Ventral setae small and slender, not numerous. Antennae with six joints. Anal ring entire, with six small setae.

### *Natalensis fulleri* Brain

(Text-fig. 3)

*Natalensis fulleri* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 91.

Four slides were available, two with larvae and two containing a single specimen in very poor condition; both being very old adults, partly broken, distorted and attacked by fungi. All slides were marked: "43, C.K.B." which is the serial number of Brain's collection. The material was originally "collected on the roots of grass in the nests of a small red ant in the Botanic Gardens, Pietermaritzburg, Natal by Mr. Claude Fuller, 1910." (Brain, *l.c.*).

"Adult female entirely enclosed in a double-walled cyst. Cyst: outer cyst may attain 9 mm. long by 5 mm. broad, dark-coloured owing to adherent soil; brittle when dry . . . Inner cyst pale buff-coloured. This has the appearance of being more loosely constructed. The outer shape and size are those of the interior of the outer cyst, from which it separates readily . . . Adult female (from dry material), after boiling in KOH dark brown in colour, broadly elliptical, 4 mm. long and 4.5 mm. broad, convex above and flat beneath." (Brain, *l.c.*). Body of mounted specimens very broadly elliptical with dermis slightly chitinized at full maturity. Cerarii recognizable only on anal lobes, each being built up by two short and stout setae surrounded by a few trilocular pores. Area about setae not chitinized. Ventral side of each anal lobe without apical seta. Multilocular disc pores, tubular ducts, tritubular ducts and circular disc pores absent. Trilocular pores few and widely scattered on both side of body. Anterior and posterior dorsal ostioles, circulus and ventral cephalic plate absent. Anal ring entire, with six setae. Antennae with six joints, devoid of any falcate sensory seta. Legs very small with tarsal digitules finely pointed; unguis slightly knobbed at apex. Body setae few, slender and widely distributed on either side.

### *Pseudococcus bantu* Brain

(Text-fig. 4)

*Pseudococcus bantu* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 137.

Four slides each with a single adult female in fairly good condition were seen. They bore the following label: "*Phenacoccus bantu* Brain; grass; P.m. burg, N.<sup>1</sup>: Nov. 1914; paratype; Char. K. Brain; 34, C.K.B." Another slide contained ova and larvae only.

<sup>1</sup> Abbreviation for Pietermaritzburg, Natal.

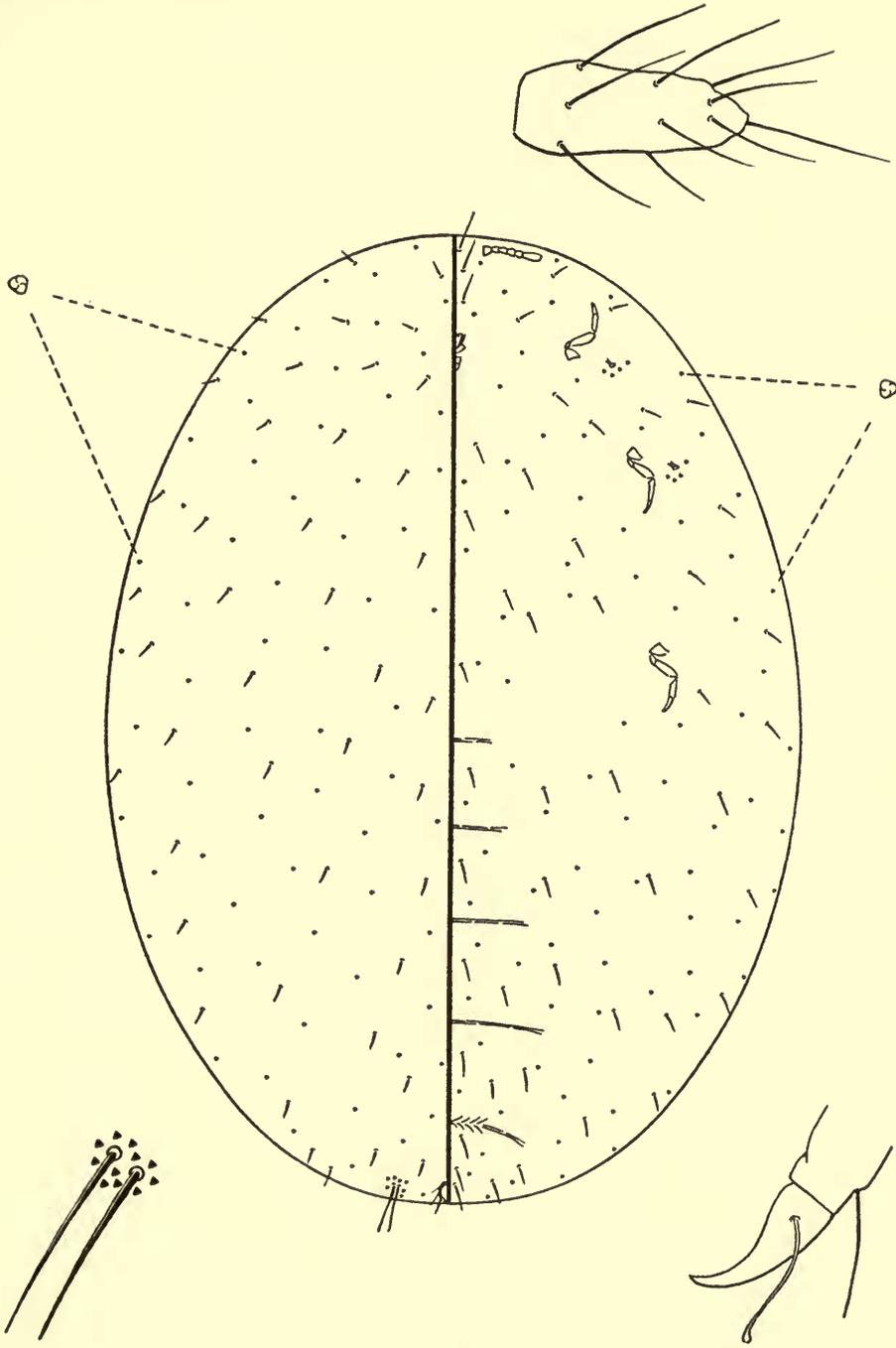


FIG. 3. *Natalensis fulleri* Brain

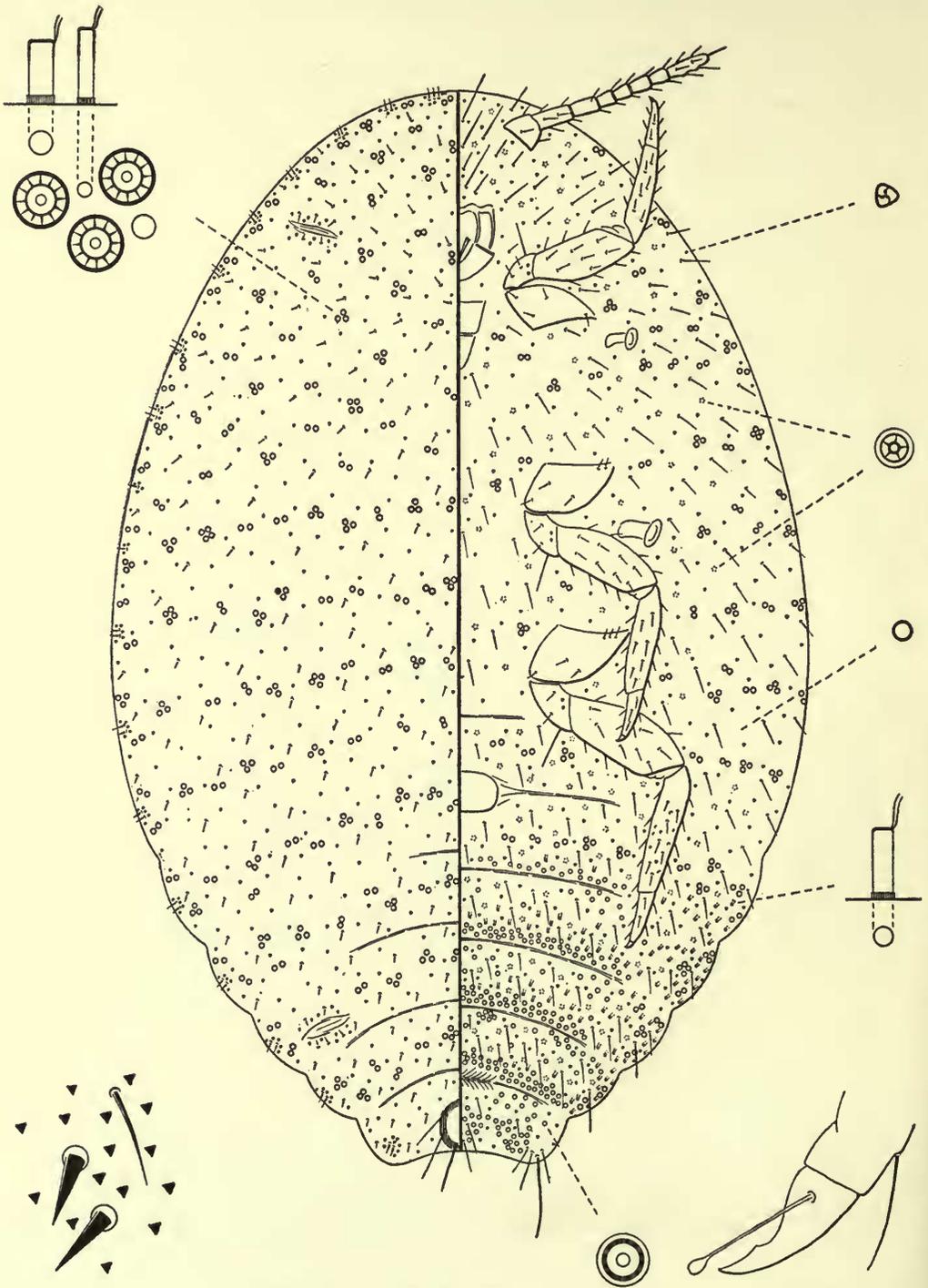


FIG. 4. *Pseudococcus bantu* Brain

"Ovisac : large clusters of irregular white ovisacs were found at the bases of the leaves and on the crowns of grass . . . Adult female: small, orange in colour, with a very slight covering of powdery secretion, but without lateral or caudal filaments . . . Mounted specimens average 2.3 mm. long by 1.8 mm. broad." (Brain, *l.c.*).

The following redescription is made from specimens collected by E. C. G. Bedford on roots of grass at Klaserie, Transvaal, South Africa, on 20.iv.1955, which were compared with Brain's paratypes.

Body elliptical, membranous. Margin of body with a complete series of eighteen pairs of cerarii each with two small conical spines, except one or two cerarii of thorax which at times are reduced to one spine only and the interantennal pair which is often provided with three spines. Each cerarius anterior to anal lobe ones is beset by a group of three to seven trilocular pores; auxiliary setae missing. Anal lobe cerarii each with a loose group of trilocular pores and one to three small auxiliary setae; area about spines not chitinized. Ventral side of each anal lobe with a robust apical seta, distinctly longer than those of anal ring; subapical seta about half the length of apical one; chitinized bar absent. Multilocular disc pores of usual type rather abundant on ventral side of last five abdominal segments, mostly arranged in transverse rows along distal margin. Other multilocular disc pores slightly larger than normal ones, set in groups of two or three—seldom four. Each cluster of pores has associated one to four tubular ducts with oral collar, one which is always smaller and set on middle. On dorsum these clusters of pores are numerous and on thorax and abdomen they are arranged in transverse segmental rows; on ventral side they mostly occur on thorax and first two abdominal segments and on marginal area of remaining abdominal segments. Quinquelocular pores present only on median and submedian areas of venter, not abundant. Tubular ducts all with one rim, and except for those associated with clusters of large multilocular disc pores, crowded along ventral marginal area of last four abdominal segments anterior to anal lobes and intermingled with normal multilocular disc pores. Trilocular pores not very numerous and evenly distributed. Circular disc pores somewhat smaller than trilocular pores and scattered on either side of body. Dorsal setae very small, spiniform; ventral ones much longer and slender. Anterior and posterior dorsal ostioles not prominent, lips membranous with a few trilocular pores and small setae. Circulus transversely elongate, membranous. Legs well developed, rather stout, with a few translucent pores on hind tibia; claw with a small denticle; unguis digitules slightly knobbed, tarsal ones finely pointed. Antennae with nine joints.

### *Pseudococcus bechuanae* Brain

(Text-fig. 5)

*Pseudococcus bechuanae*, 1915, *Trans. roy. Soc. S. Afr.* 5 : 108.

Two sides were studied, each containing a single specimen, partly distorted, labelled: "*Pseudococcus bechuanae* Br.; on *Geranium*; Vryburg, Bechuanaland, 2.xii.1914; C. K. Brain; B. 53; C.K.B."<sup>1</sup>

<sup>1</sup> In the original paper the date is 3.xii.1914. Evidently there has been a mistake on labelling the slides, as all other collecting data are identical.

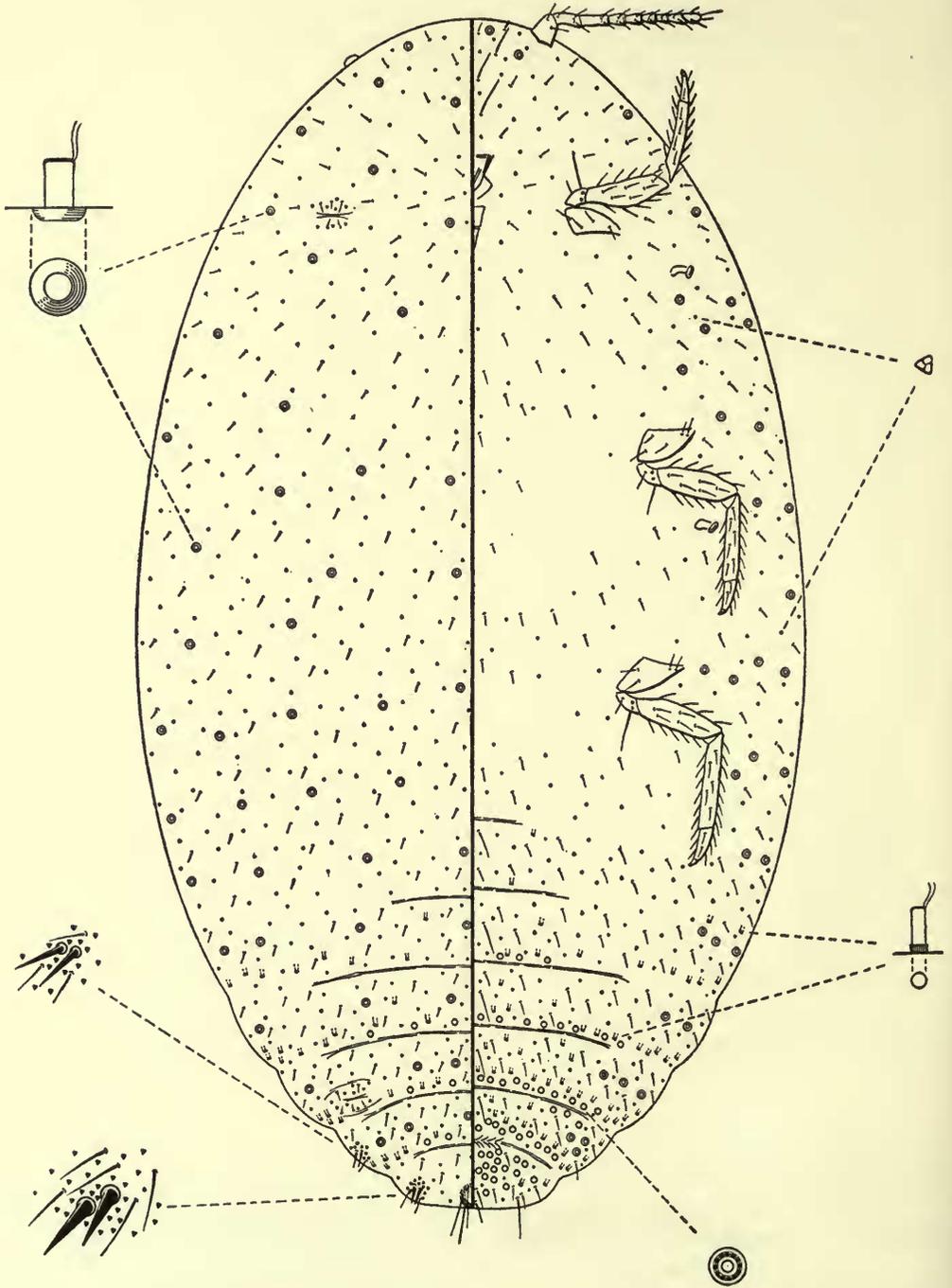


Fig. 5. *Pseudococcus bechuanæ* Brain

"The specimens had been badly shaken in the post, but it was clear that large patches of the stem had been completely covered with ovisacs. The white secretion appeared powdery rather than cottony. The females embedded in this were pinkish in colour when young, but purplish in older specimens. There were no lateral filaments, and only two short, blunt, caudal ones. The female when adult reaches approximately 3 mm. in length." (Brain, *l.c.*). Mounted specimens elongate elliptical, membranous. Margin of body provided with anal and preanal cerarii only. Each of them built up with two conical spines surrounded by a small group of trilocular pores and a few slender auxiliary setae; area about spines not chitinized. Ventral side of each anal lobe without chitinized bar; apical seta robust, somewhat shorter than those of anal ring; subapical seta much shorter. Multilocular disc pores rather few and arranged in five groups on ventral side of last abdominal segments. The number of pores in one specimen was as follows: (v) 6; (vi) 18; (vii) 21; (viii) 29; (ix + x) 28. A few multilocular disc pores occur on dorsal side of three abdominal segments anterior to anal one. Tubular ducts with oral rim fairly numerous on dorsum and a few scattered along marginal and submarginal areas of abdomen. Tubular ducts with oral collar arranged in four or five groups on ventral marginal area of last abdominal segments anterior to anal lobes; others distributed in irregular rows in association with dorsal and ventral multilocular disc pores. Trilocular pores rather numerous and uniformly distributed on both sides of body. Circular disc pores apparently absent. Anterior and posterior dorsal ostioles inconspicuous, lips membranous with a small grouping of trilocular pores and a few small setae. Circulus absent. Legs well developed, without translucent pores. Ventral and dorsal body setae very small and slender. Antennae 8-jointed with a pseudoarticulation on apical joint.<sup>1</sup>

### *Pseudococcus burnerae* Brain

(Text-fig. 6)

*Pseudococcus burnerae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 111.

*Pseudococcus simulator* James, 1933, *Bull. ent. Res.* 24: 434 (SYN. NOV.).

A fairly long series of specimens from the typical material originally studied by Brain was available. The slides were as follows: four with altogether twelve specimens labelled: "*Pseudococcus burnerae* Brain; on *Sida longipes*; Pretoria: Oct. 11, 1914; Char. K. Brain; B. 45, C.K.B." Two more slides of this series contained only eggs, larvae and adult males. Two slides each with a single specimen marked only with the serial number "B. 50, C.K.B." Three slides with altogether twelve specimens also marked with the serial number only "66, C.K.B.". Three slides each with a single specimen labelled: "*Pseudococcus burnerae* Brain; on granadilla;

<sup>1</sup> *Pseudococcus bechuanae* is so close to *lounsburyi* that a careful and detailed study of a long series of specimens of both species might lead to the conclusion that they are actually synonyms or at most that they represent only forms of the same systematic species. As far as it can be presumed from the structures of the paratypes of both species and from supplementary material of *lounsburyi* examined up to present, *bechuanae* differs from *lounsburyi* by having the tubular ducts of oral collar type confined to the abdominal segments, while in *lounsburyi* they extend as far as the head.

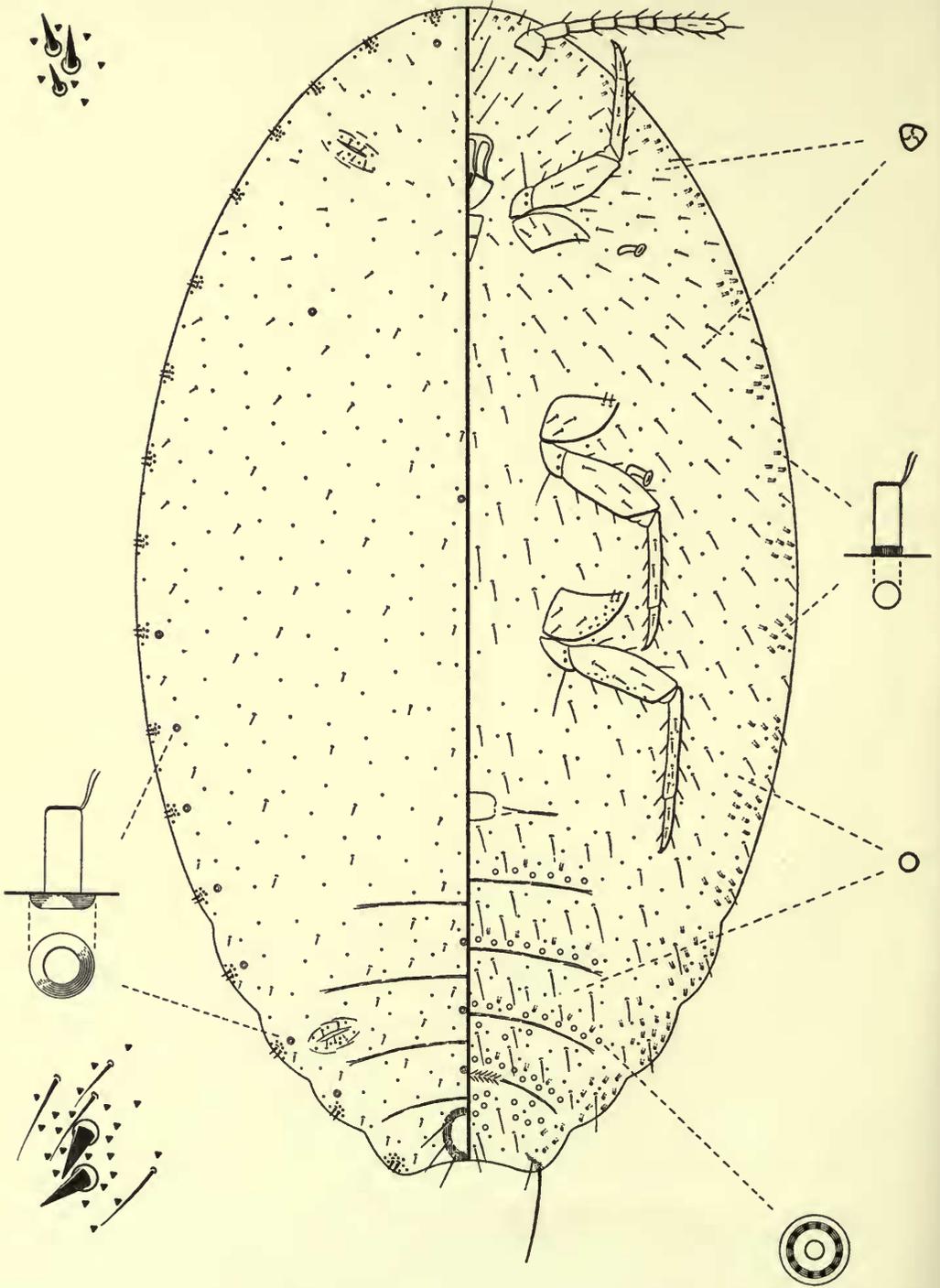


FIG. 6. *Pseudococcus burnerae* Brain

Pretoria: Dec. 1914; paratypes; 66a, C.K.B." Seven more slides with eighteen specimens labelled: "*Pseudococcus burnerae* Brain; Foxslave; Pretoria: 10.1.1915; Char. K. Brain; 47a, C.K.B." were also seen, although they do not belong to the typical series.

"Adult females with ovisacs usually aggregated in compact masses on the under-side of the leaves of the various host plants. The ovisacs are white, cottony, generally more or less spherical when complete, but the exact contour often obscured by the crowding of many together. The adult female is generally visible on top of the ovisac, the sides of which are raised around the insect. It therefore looks as though it had been pushed into the soft cottony mass. In other cases the insect is found at one side of the ovisac, which protrudes behind and below it, giving a decided *Pulvinaria* effect . . . The adult female is so densely covered with white, powdery secretion that the general body colour is entirely obscured. The colour impression conveyed, however, is grey—perhaps slightly purplish or brown. There is no median, dorsal, clear patch as in *citri*. All filaments are slender except the two caudal ones, which are more delicate than those of *citri*. The caudal filaments may attain one-third the length of the body. The lateral ones are similar to those of *capensis* in that they are shortest at the anterior end, and gradually increase in length towards the posterior extremity. When mounted the adult female is about 2.5 mm. long and 1.5 mm. broad." (Brain, *l.c.*).

The following redescription is based on a series of twelve specimens collected in Pretoria on 16.vii.1954 on *Caralluma caudata* N. E. Br. by Dr. H. K. Munro, which were compared with the Brain's paratypes.

Outline of mounted specimens elliptical. Margin of body with seventeen pairs of cerarii. Anal lobe cerarii each built up with two conical spines beset with a small group of trilocular pores and four or five short auxiliary setae; area about cerarian spines not chitinized. Each of remaining cerarii also with two spines somewhat shorter, except frontal (xvii) and ocular (xvi) each of which have three—occasionally four—spines; each cerarius is surrounded by five to eight trilocular pores without auxiliary setae. Ventral side of anal lobes each with an ill-bordered slightly chitinized bar; apical seta robust, distinctly longer than those of anal ring; subapical one much shorter. Multilocular disc pores distributed in five groups on ventral side of last abdominal segments as follows: (v) 12-19; (vi) 15-21; (vii) 15-20; (viii) 22-26; (ix + x) 15-24. On segments anterior to genital opening they are arranged in transverse rows along distal margin of segment involved. Dorsal tubular ducts with oral rim few; one duct is normally associated with each abdominal cerarius anterior to anal lobe and one duct is always present near each frontal cerarius; one duct on median area of first to third abdominal segments anterior to anal one; occasionally a few ducts are interpolated on median or submedian areas of thorax. Ventral tubular ducts with oral collar crowded all along marginal area; a few are associated with ventral multilocular disc pores. Trilocular pores not numerous and evenly distributed. Circular disc pores smaller than trilocular pores, very few on both sides of body. Dorsal setae few, all short and slender; ventral ones much longer and more abundant. Anterior and posterior dorsal ostioles rather inconspicuous with lips membranous. Circulus rather variable in size, normally small, roundish or

elongate, with surface smooth. Legs well developed with some translucent pores on hind coxa, femur and tibia. Antennae with eight joints.

In our paper dealing with the Pseudococcidae described by H. C. James from East Africa (De Lotto, 1957) we sunk *Pseudococcus simulator* James as a synonym of *muraltae* Brain. In that action we assumed the occurrence of a circulus in Brain's paratype of *muraltae* studied in London, but examination of further specimens showed that it is not present in the species. After examining one more paratype of *muraltae* and the long series of slides of *burnerae* above listed, in the collection of the Department of Agriculture in Pretoria, we came to the conclusion that in these two species, which are structurally very similar, the only reliable character on which they depart is the circulus, which in *muraltae* is entirely missing, whilst in *burnerae* is always present, as is the case in *simulator*. Therefore *Pseudococcus simulator* James is now synonymized with *burnerae* instead of *muraltae*. In *simulator* the dorsal tubular ducts with oral rim tend to be fewer than in typical *burnerae*, but in all other respects they are identical.

### *Pseudococcus caffra* Brain

(Text-fig. 7)

*Pseudococcus caffra* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 138.

One single slide marked with the serial number of Brain's collection "41, C.K.B." was seen. It contained two specimens originally mounted without having been boiled in KOH or cleaned of the body content. In one specimen both antennae were partly broken away.

Adult female "appeared to have made elongate ovisacs which had been crushed or broken in transit. There was no cottony material present, but rather a dense, powdery secretion. The adult female is orange-brown in colour except at the extremities, which are decidedly pinkish. The largest specimen seen measured 2.4 mm. in length. Mounted specimens average 1.8 mm. in length and 0.8 mm. broad." (Brain, *l.c.*). Mounted specimens very elongate elliptical, membranous. Marginal and anal lobe cerarii entirely missing. Ventral side of anal lobes each with a robust apical seta, somewhat longer than those of anal ring; chitinized bar absent. Multilocular disc pores of usual type very numerous on ventral side of last four abdominal segments; on three segments anterior to genital opening they are arranged in transverse rows near distal margin; other pores are scattered on either side of body. Other larger multilocular disc pores having twenty or more small loculi are fairly abundant on dorsum and on marginal area of abdomen. Tubular ducts with oral collar few on ventral side of last five abdominal segments. Trilocular pores absent. Circular disc pores small, few and scattered on both sides of body. Dorsal setae, few, very short, spiniform; ventral setae more abundant and much longer. Anterior dorsal ostioles not recognizable; posterior ones small, with lips membranous. Circulus absent. Legs long and slender with ungual digitules knobbed; tarsal ones finely pointed; tibiae of hind legs with a few translucent pores; claw without denticle. In the specimen in which the antennae were intact, both were 8-jointed.

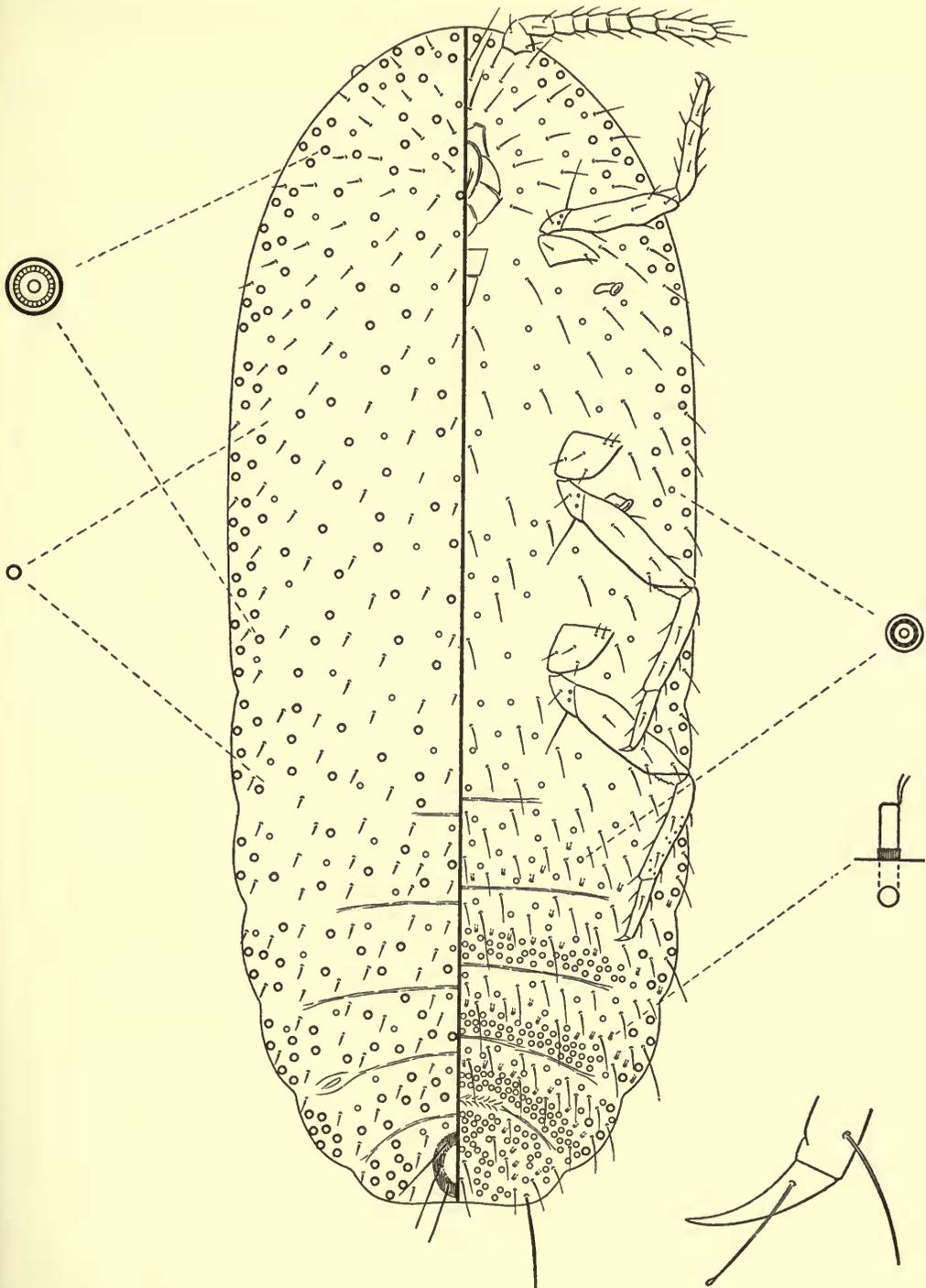


FIG. 7. *Pseudococcus caffra* Brain

***Pseudococcus capensis* Brain (= *Pseudococcus maritimus* (Ehrhorn))**

*Pseudococcus capensis* Brain, 1912, *Ann. ent. Soc. Amer.* 5 : 182.

This species was synonymized with *Pseudococcus maritimus* (Ehrhorn) by Joubert in 1928. A re-examination of some of Brain's types fully supports this action.

***Pseudococcus citri phenacocciformis* Brain (= *Planococcus citri* (Risso))**

*Pseudococcus citri phenacocciformis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 116.

Recently Ezzat & McConnell (1956) recognized this variety as identical with *Planococcus citri* (Risso) with which they synonymized it. Two of Brain's types were seen by us and we agree with Ezzat & McConnell's opinion.

***Pseudococcus elisabethae* Brain (= *Pseudococcus quaesitus* Brain)**

*Pseudococcus elisabethae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 126.

One slide was seen containing four young adult females, three of which in rather poor condition. It was labelled : "*Pseudococcus rhenosterbosi* Brain ; on rhenosterbosch ; Newlands, C.P.: Jan. 17, 1915 ; paratype ; B. 58, C.K.B." Although the specific name on the label is different from that published by Brain, there are no doubts that the specimens actually belong to *elisabethae* inasmuch as the collection data and serial number are exactly the same as those reported in his original paper.

*Pseudococcus elisabethae* is structurally identical with *quaesitus* described by Brain in the same paper and with which it is here synonymized, *quaesitus* having page precedence. Brain's diagnosis of *elisabethae* was based on a series of very young adult females.

***Pseudococcus flagrans* Brain**

(Text-fig. 8)

*Pseudococcus flagrans* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 140.

Three slides containing altogether five specimens in rather good condition were seen. All slides were marked with the serial number of Brain's collection : "69, C.K.B."

"Adult female : elongate, parallel-sided, about 4 mm. long, bright pink to flesh-coloured. No lateral filaments were observed, but in two cases short caudal ones were present, while one insect indicated that there may, in certain cases, be four caudal filaments instead of two . . . Females . . . up to 4 mm. in length." (Brain, *l.c.*). Mounted specimens elongate elliptical, membranous. Margin of body with fifteen to seventeen pairs of cerarii. Anal lobe and preanal lobe cerarii each provided with two slender slightly lanceolate spines. Antepenultimate cerarii each with one or two spines smaller than those of anal lobes. Remaining cerarii each with a single spine ; the spines tending to be progressively smaller anteriorly. Area about cerarian spines not chitinized ; auxiliary setae absent. Apical seta of

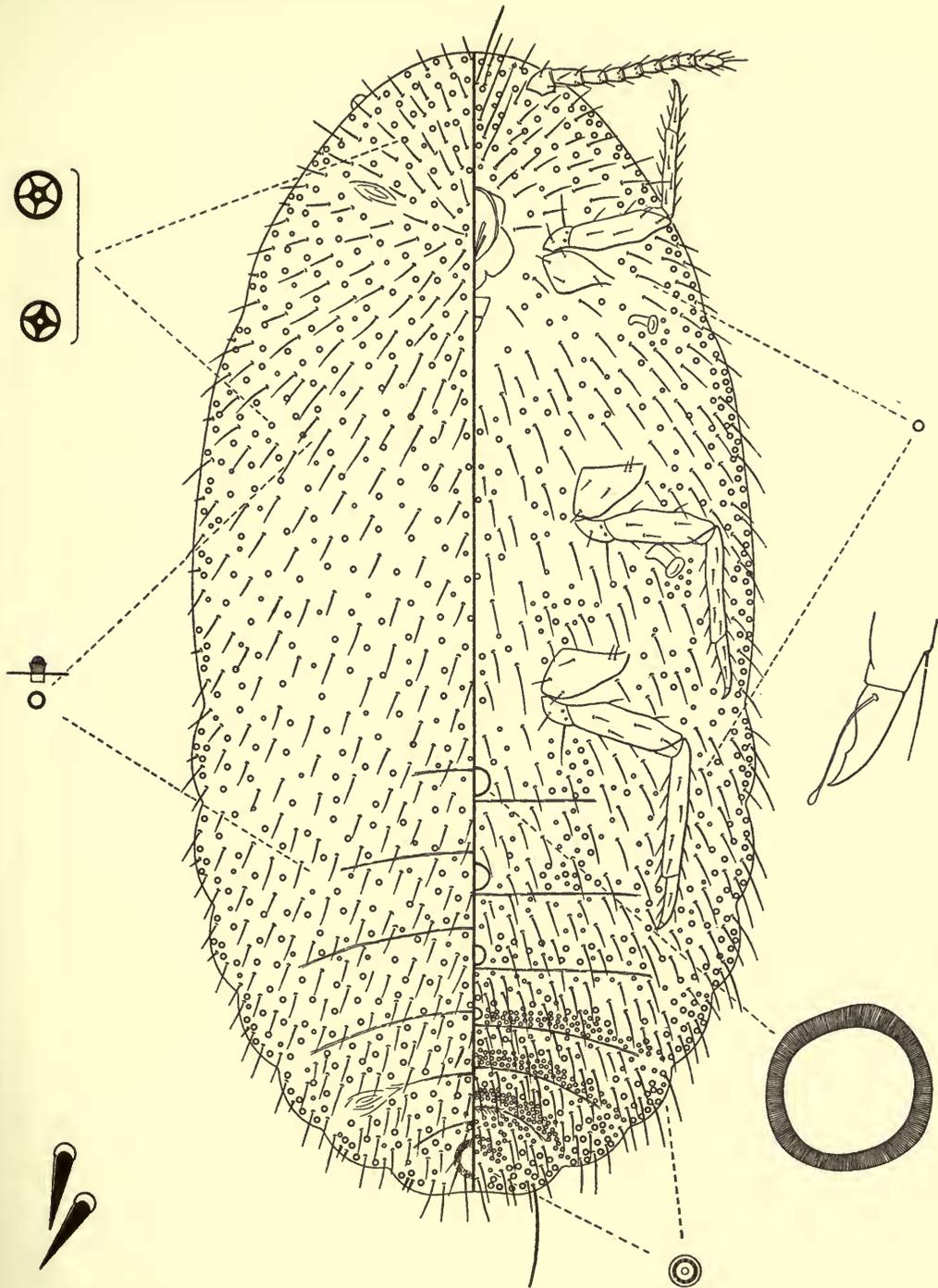


FIG. 8. *Pseudococcus flagrans* Brain

each anal lobe long and robust; dorsal chitinized bar absent. Multilocular disc pores of usual type abundantly distributed all over body and particularly numerous on ventral side of last four abdominal segments. Larger multilocular disc pores represented by a type with five loculi, seldom with four. They are numerous on both sides of body, particularly so on dorsum and marginal area of venter. Tubular ducts very small with inner portion somewhat chitinized, rather numerous on either side of body. Circular disc pores small, not abundant and scattered on venter and dorsum. Trilocular pores entirely absent. Ventral and dorsal setae long, robust and fairly numerous. Anterior and posterior dorsal ostioles rather inconspicuous, lips membranous. Circuli four, circular or nearly so in shape, with surface membranous, rim thick and heavily chitinized. First two circuli about same diameter, third one smaller; the posterior one smaller still and about half the size of anteriors. Legs all well developed with a denticle on claw; tarsal digitules finely pointed, unguis ones knobbed at apex. No translucent pores were seen on hind legs of specimens examined. Antennae with nine joints. Anal ring entire with six robust setae distinctly shorter than apical seta of anal lobes.

### *Pseudococcus fragilis* Brain

*Pseudococcus fragilis* Brain, 1912, *Ann. ent. Soc. Amer.* 5: 186.

*Pseudococcus gahani* Green, 1915, *Ent. mon. Mag.* 51: 179.

At page 351 of his book *College Entomology*, Essig (1942) recorded *Pseudococcus gahani* Green, 1915 as a synonym of *P. fragilis* Brain, 1912, without giving any indication how he came to this conclusion or on whose authority it was based. In recent correspondence received from Mr. C. J. Joubert of the Stellenbosch-Elzenburg Agricultural College, Stellenbosch, South Africa, we have been informed that several years ago he studied the identity of *fragilis* and *gahani* which he recognized structurally identical. According to him, in 1933 he communicated his finding to Essig who apparently took for granted that by the time his text-book was issued Joubert would have published the result of his investigation, which he has not done.

Independently we came to the same conclusion when at the British Museum (Natural History), London, we compared types or paratypes of both species.

### *Pseudococcus lounsburyi* Brain

*Pseudococcus lounsburyi* Brain, 1912, *Ann. ent. Soc. Amer.* 5: 179.

Two slides were available. One with a single specimen, the other with five, all rather young adult females with many setae and cerarian spines broken away and partly attacked by fungi. Both slides bore the following label: "*Pseudococcus lounsburyi* Brain; paratype; but setae of anal lobes lacking; on *Agapanthus* sp.; Kenilworth, S.A.: 14.ix.1910."

Two excellent redescriptions of this species were recently published by Ferris (in Zimmerman, 1948; Ferris, 1950). On some remarks on the species contained in the *Atlas of the Scale Insects of North America*, it is pointed out that according to Morrison's opinion the specimens from Hawaii determined by Ferris as *lounsburyi*

and used for diagnosis and figure, although very close to it, would not belong to that species in view of a noticeable difference in the number of multilocular disc pores occurring on the ventral side of the abdominal segments. Besides the paratypes above mentioned, at the British Museum (Natural History), London, we examined another slide of the same typical series, and supplementary specimens are at hand from South Africa on *Agapanthus* sp. and on bulbs of *Narcissus* sp. as well as from Kenya also on *Agapanthus* sp. We are prepared to accept the insect redescribed by Ferris as *lounsburyi*, since the number of multilocular disc pores in the species in question is variable and occasionally a few occur even on the dorsum of the last two or three segments anterior to the anal one. Even the number of tubular ducts with oral rim is rather variable.

### *Pseudococcus mallyi* Brain

(Text-fig. 9)

*Pseudococcus mallyi* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 120.

The material examined was represented by two slides containing altogether three specimens in fairly good condition, labelled: "*Pseudococcus mallii*<sup>1</sup> Brain; on grass; Rosebank, C.P.; Nov. 25, 1914; paratype; Char. K. Brain; 32, C.K.B." Four other slides not belonging to the typical material, although marked with the same serial number of Brain's collection, were seen. They bore the following label: "*Pseudococcus mallyi* Brain; on grass; Rosebank Exp. Sta.: May 10, 1915; det. C.K.B.; 32, C.K.B."

"No definite ovisac was seen, but adult females and young were clustered in a white powdery secretion in the leaf sheaths . . . The adult is bright rose-pink in colour, some specimens being uniformly covered with white powder. There were no traces of filaments of any kind. Legs and antennae colourless. The insect is exceptionally long and narrow, mounted specimens averaging 2.16 mm. long by 0.75 mm. broad." (Brain, *l.c.*) Body very elongate elliptical, membranous. Cerarii recognizable only on last three or four abdominal segments. Anal lobe cerarii each with two rather long slender spines of different size. On each of preceding cerarii spines tend to be more slender and set apart each other. Cerarii on third segment anterior to anal lobes at times represented by a single spine. All cerarii without auxiliary setae or grouping of trilocular pores; area about spines not chitinized. Ventral side of each anal lobe without chitinized bar; apical seta robust and longer than those of anal ring; subapical one much shorter. Multilocular disc pores rather numerous and distributed on either side of body; on ventral side of two segments anterior to genital opening several pores are crowded in transverse rows along distal margin. Trilocular and quinquelocular pores entirely absent. Tubular ducts of oral collar type very short, not numerous and distributed on venter and dorsum without any peculiar arrangement. Circular disc pores few and scattered on both sides of body. Dorsal setae very short, spiniform, rather few; ventral setae more numerous and much longer. Anterior dorsal ostioles absent; posterior ones incon-

<sup>1</sup> Evidently a pen slip for *mallyi*.

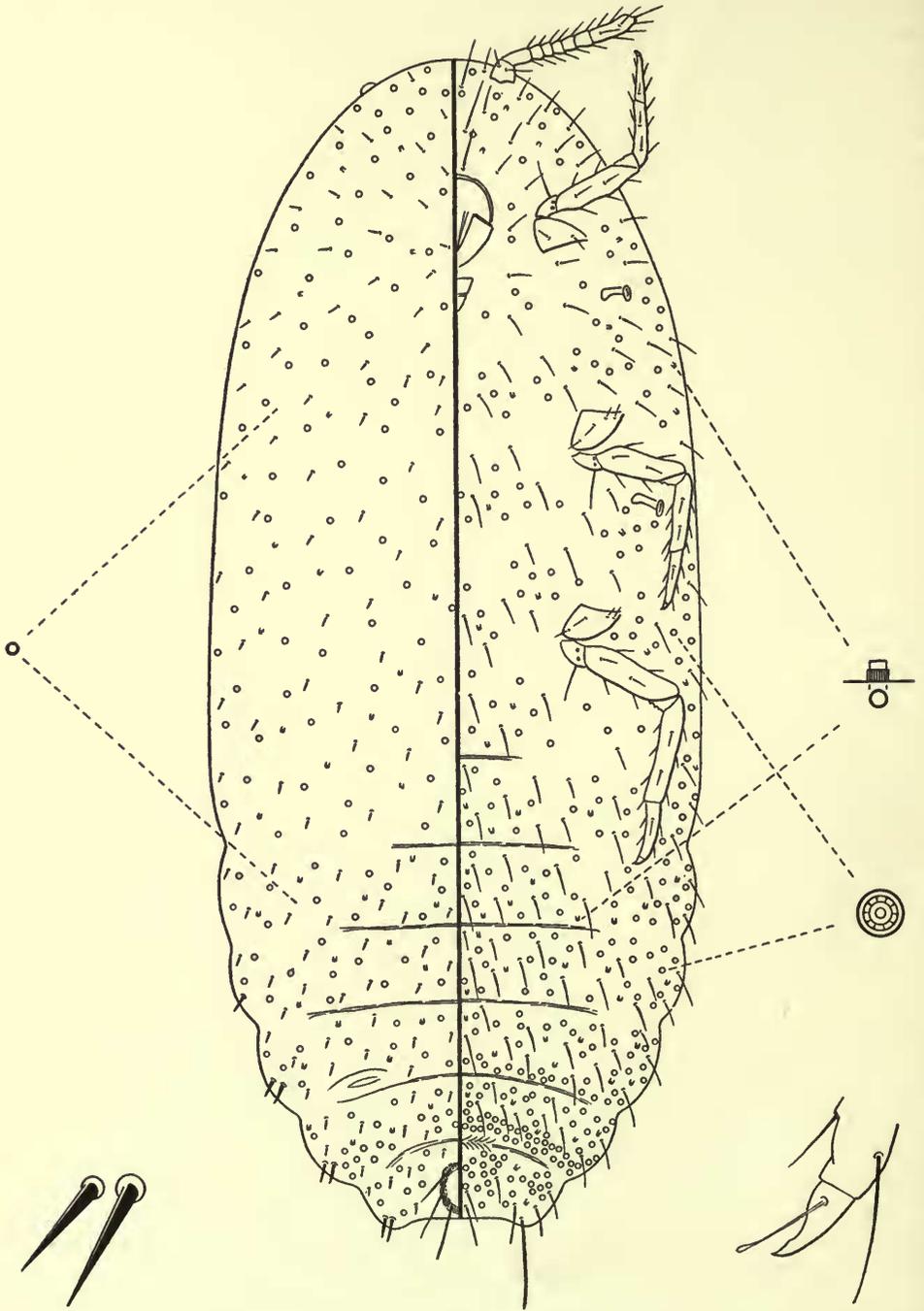


FIG. 9. *Pseudococcus mallyi* Brain

spicuous with lips membranous and without trilocular glands or setae. Circulus missing. Legs all well developed with a small denticle on claw; tarsal digitules finely pointed; unguinal ones knobbed at apex. Antennae with eight short and stout joints. Anal ring entire with six robust setae.

### *Pseudococcus mirabilis* Brain

(Text-fig. 10)

*Pseudococcus mirabilis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 121.

Four slides of which three containing a single specimen and one with five specimens were available. Two slides were labelled: "*Pseudococcus mirabilis* Br.; on<sup>1</sup>; Ceres, C.P.; Oct. 1898; B. 54; C.K.B." Remaining two slides marked only "*Pseudococcus mirabilis*; B. 54, C.K.B." All specimens were adult females in very poor condition, partly broken and badly distorted.

"The ovisacs are creamy-white or slightly buff-coloured, and are aggregated on the leaf-cluster bases in conspicuous masses . . . The adult is apparently viviparous . . . When fully distended it is no more than 1.5 mm. long." (Brain, *l.c.*). Mounted specimens elongate to very broadly elliptical with dermis membranous. Marginal cerarii present only on last three—occasionally four—abdominal segments. Each cerarius is formed by two stout conical spines surrounded by many tubular ducts, without any grouping of trilocular pores; auxiliary setae absent; area about cerarian spines not chitinized. Third cerarius anterior to anal lobe one, when present, reduced to a single spine. Ventral side of each anal cerarius with a robust apical seta about same size as those of anal ring; chitinized bar absent. Multilocular disc pores arranged in five ventral groups. The number of pores in one specimen was as follows: (v) 17; (vi) 25; (vii) 26; (viii) 27; (ix + x) 29. On segments anterior to genital opening they are set in fairly linear transverse rows along distal margin. A few pores are scattered on dorsum of abdomen. Tubular ducts with oral collar of two different sizes. Large ones set in groups on ventral and dorsal marginal areas as far as head; a few others arranged on dorsum along distal margin of abdominal segments anterior to anal lobes. Tubular ducts of smaller size occurring in transverse irregular rows on either side of abdomen; others scattered all over body. Trilocular pores very few and uniformly distributed. Circular disc pores about half the size of trilocular pores, few and scattered on dorsum and venter. Dorsal and ventral setae about same size, all rather short, stout to very stout, not numerous; a few setae on dorsum of last abdominal segments similar in shape and size to those of marginal cerarii. Anterior dorsal ostioles not recognizable; posterior ones fairly prominent with lips membranous and provided with a few small setae and trilocular pores. Circulus absent. Legs well developed, with some translucent pores on hind femur and coxa; claw without denticle; unguinal and tarsal digitules apically knobbed. Anal ring V-shaped with six setae. Antennae 7-jointed with a pseudo-articulation on apical joint.

<sup>1</sup> The name of the host plant is omitted. According to the original description it is *Borbonia cordata* L.

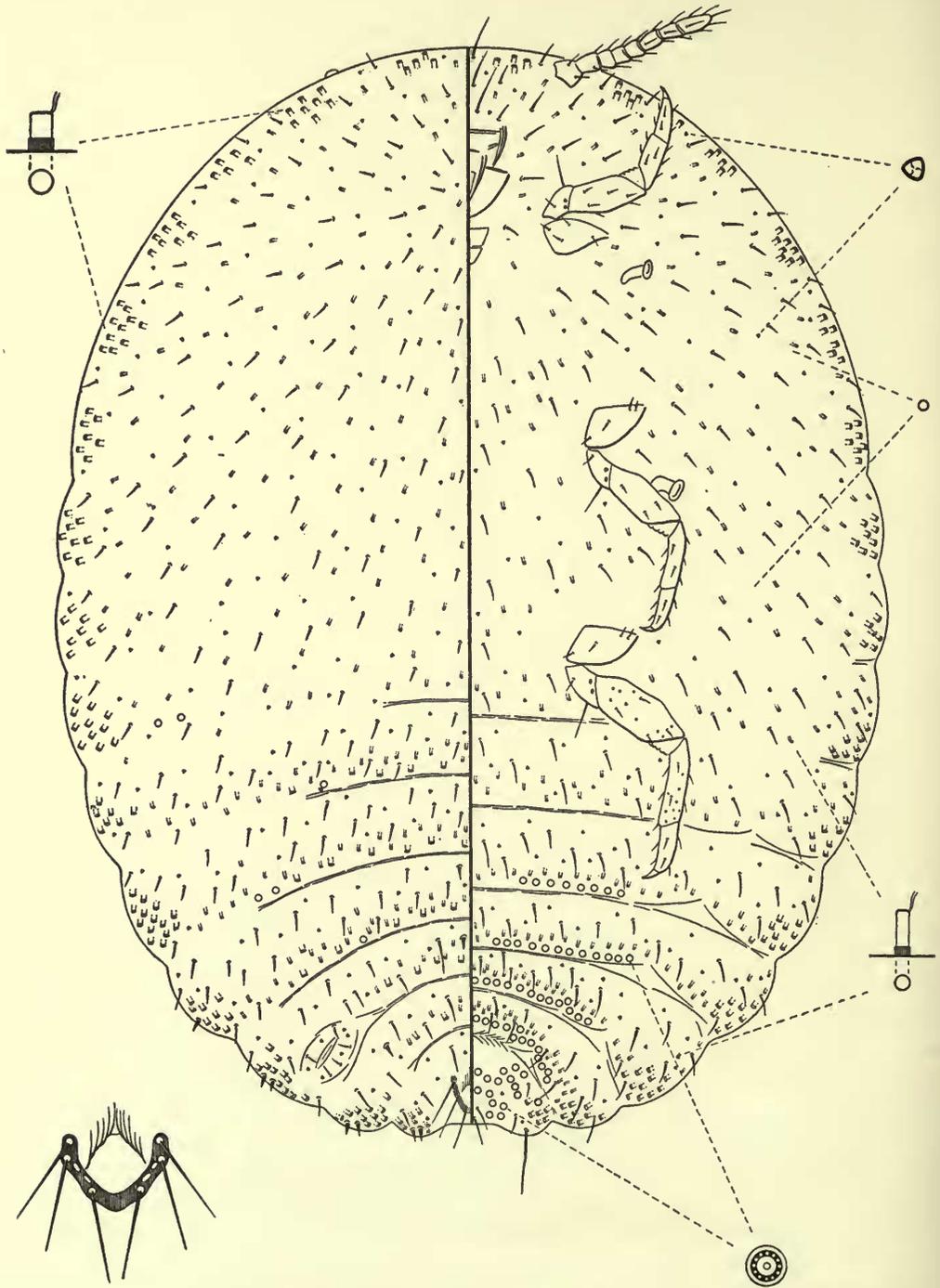


FIG. 10. *Pseudococcus mirabilis* Brain

*Pseudococcus muraltae* Brain

(Text-fig. 11)

*Pseudococcus muraltae* Brain, 1912, *Ann. ent. Soc. Amer.* 5: 184.

Two slides were seen in Pretoria, one of which containing larvae; the second with a single specimen distorted and partly broken labelled: "*Pseudococcus muraltae* Brain; on *Muraltia heisteria*; Newlands: 22.x.1910; paratype; 52, C.K.B." Another slide with two specimens bearing the same collecting data was previously examined at the British Museum (Natural History), London.

"Adult female: small; largest specimens, with completed ovisac, was 1.9 mm. long by 1.13 mm. broad, slatey-grey in colour; waxy secretion scant but segmentation conspicuous. Lateral appendages were absent but usually four caudal ones present." (Brain, *l.c.*) Body of mounted specimens rather broadly elliptical, membranous. Margin of body with seventeen pairs of cerarii. Anal lobe cerarii each with two moderately robust conical spines beset by few trilocular pores and four to six small slender auxiliary setae. Area about spines not chitinized. Each of remaining cerarii with two spines which tend to be more slender anteriorly, where they attain about same size and shape as dorsal setae; each cerarius is surrounded by a group of two to five trilocular pores without auxiliary setae; one or two thoracic cerarii reduced to a single spine. Ventral side of each anal lobe without chitinized bar; apical seta robust, longer than those of anal ring; subapical one much shorter. Multilocular disc pores few, occurring on ventral side of last five abdominal segments. The number of pores in one specimen was as follows: (v) 3; (vi) 19; (vii) 17; (viii) 45; (ix + x) 16. On segments anterior to genital opening they are arranged in transverse rows along distal margin only. Ventral tubular ducts with oral collar not numerous and mostly distributed on marginal area of last five or six abdominal segments; a few occur on median and submedian areas in association with multilocular disc pores. Dorsal tubular ducts with oral rim very few. One duct is normally associated with each frontal cerarius and one with each preanal cerarius; two or three occasionally occur on thorax and one on median area of preanal segment. Trilocular pores not abundant but evenly distributed. Circular disc pores noticeably smaller than trilocular pores, very few and scattered. Ventral setae moderately long and slender; dorsal ones much shorter. Circulus absent. Anterior and posterior dorsal ostioles inconspicuous with lips membranous and provided with two or three small setae and a few trilocular pores. Legs well developed but rather short with a few translucent pores on hind coxa. Antennae with eight joints.

The synonymy of *Pseudococcus simulator* James with *muraltae* published in our previous paper (De Lotto, 1957) has to be rejected because in *muraltae* the circulus is absent. *P. simulator* is instead a synonym of *burnerae* as pointed out in our notes on dealing with that species.

*Pseudococcus natalensis* Brain (= *Nipaecoccus graminis* (Maskell))*Pseudococcus natalensis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 100.

We have been kindly informed by Dr. D. J. Williams of the Commonwealth Institute of Entomology, London, that this species is identical with *Nipaecoccus*

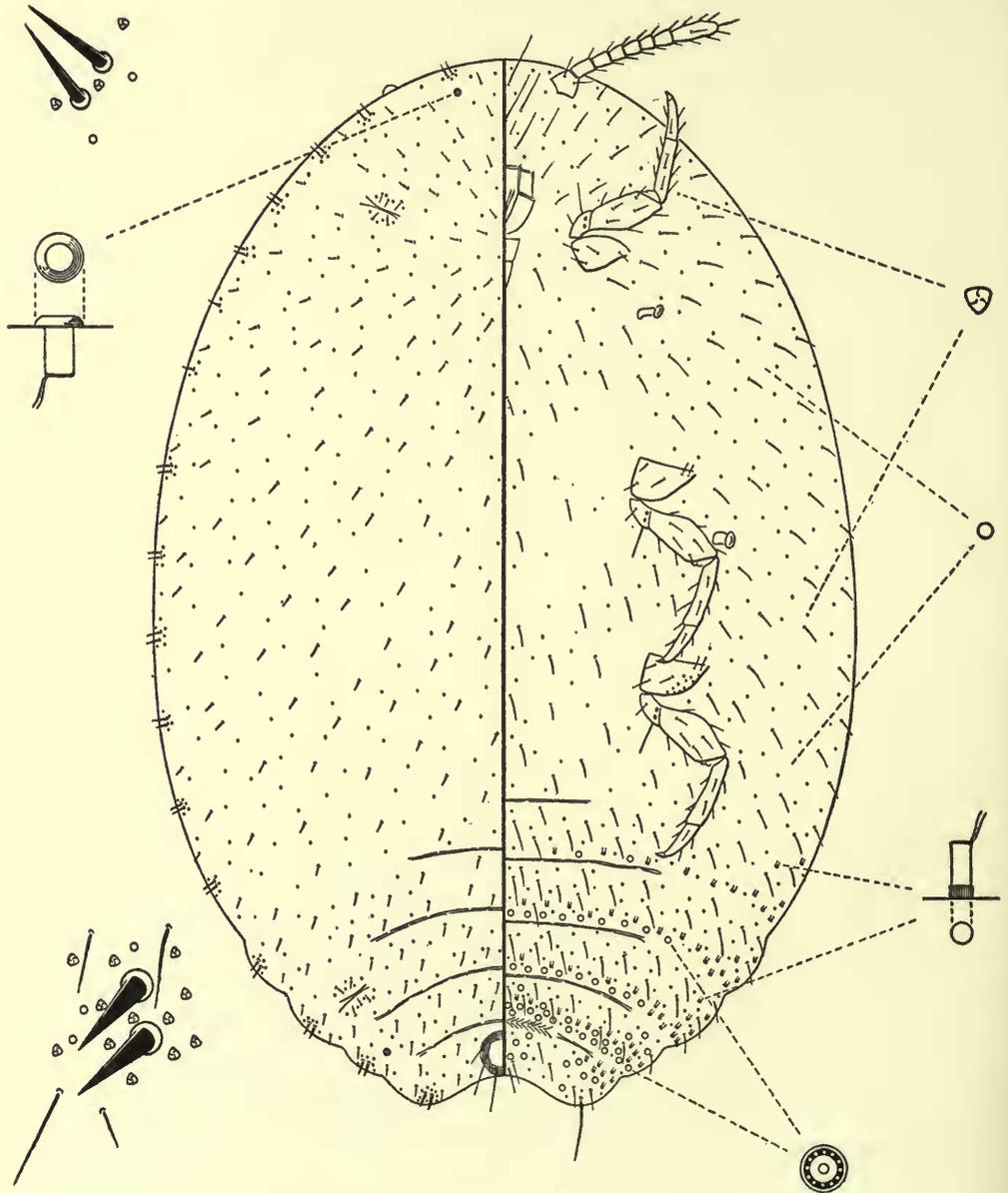


FIG. 11. *Pseudococcus muraltiae* Brain

*graminis* (Maskell). Recently he examined type material of Maskell's species and this new synonymy is dealt with in his paper on Pseudococcidae described by Maskell, Cockerell, Newstead and Green from the Ethiopian region (1958).

*Pseudococcus nitidus* Brain

(Text-fig. 12)

*Pseudococcus nitidus* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 143.

The material examined was represented by six slides, three of which each contained a single specimen labelled: "*Pseudococcus nitidus* Brain; on *Acacia caffra*; Pretoria: Nov. 1914; paratype; 39, C.K.B." All specimens were in very poor condition, distorted and partly broken, having been mounted from dry material. The remaining three slides contained only larvae and males.

"The ovisacs . . . are closely felted, smooth, and in the majority of cases have the shape and approximate size of an adult insect, being about 3 mm. long and so smoothly felted on the exterior as to look like a piece of white kid . . . Adult female 2.5 mm. long, translucent brown in colour; legs and antennae of the same colour. No waxy secretion and no filaments except two extremely short caudal ones which appear as two white specks." (Brain, *l.c.*). Body of mounted specimens rather elongate elliptical with anal lobes strongly developed; dermis at maturity membranous. Margin of body with only five pairs of cerarii on last abdominal segments. Anal lobe cerarii each formed with two small conical spines set apart from each other, without auxiliary setae or grouping of trilocular pores; area about spines clear. Remaining cerarii each with two spines which tend to be smaller and more widely separate from each other anteriorly; on fourth cerarius anterior to the anal lobe one they attain shape and size of dorsal setae. Ventral side of each anal lobe with a long and robust apical seta and a much shorter subapical one; chitinized bar absent. Multilocular disc pores few and present only on ventral side of last three abdominal segments. The number of pores in one specimen was as follows: (vii) 11; (viii) 24; (ix + x) 32. On segments (vii) and (viii) they are arranged in transverse rows along distal margin only. Tubular ducts with oral collar very few on ventral side of last abdominal segments, mostly in association with multilocular disc pores. Tubular ducts with oral rim very numerous on dorsum and extending all along marginal area of venter. Quinquelocular pores fairly abundant on median and submedian areas of venter except on segment posterior to genital opening, where they are missing. Trilocular pores not numerous and evenly distributed. Circular disc pores apparently absent. Anterior and posterior dorsal ostioles not detected. Circulus absent. Legs long and rather slender, with a small denticle on claw; ungual digitules knobbed at apex; tarsal ones finely pointed; no translucent pores on hind legs. Anal ring of Pseudococcid type, with six setae. Stigmatic openings unusually large. Dorsal setae rather few, small, spiniform; ventral ones longer and slender. Antennae formed by nine long slender joints.

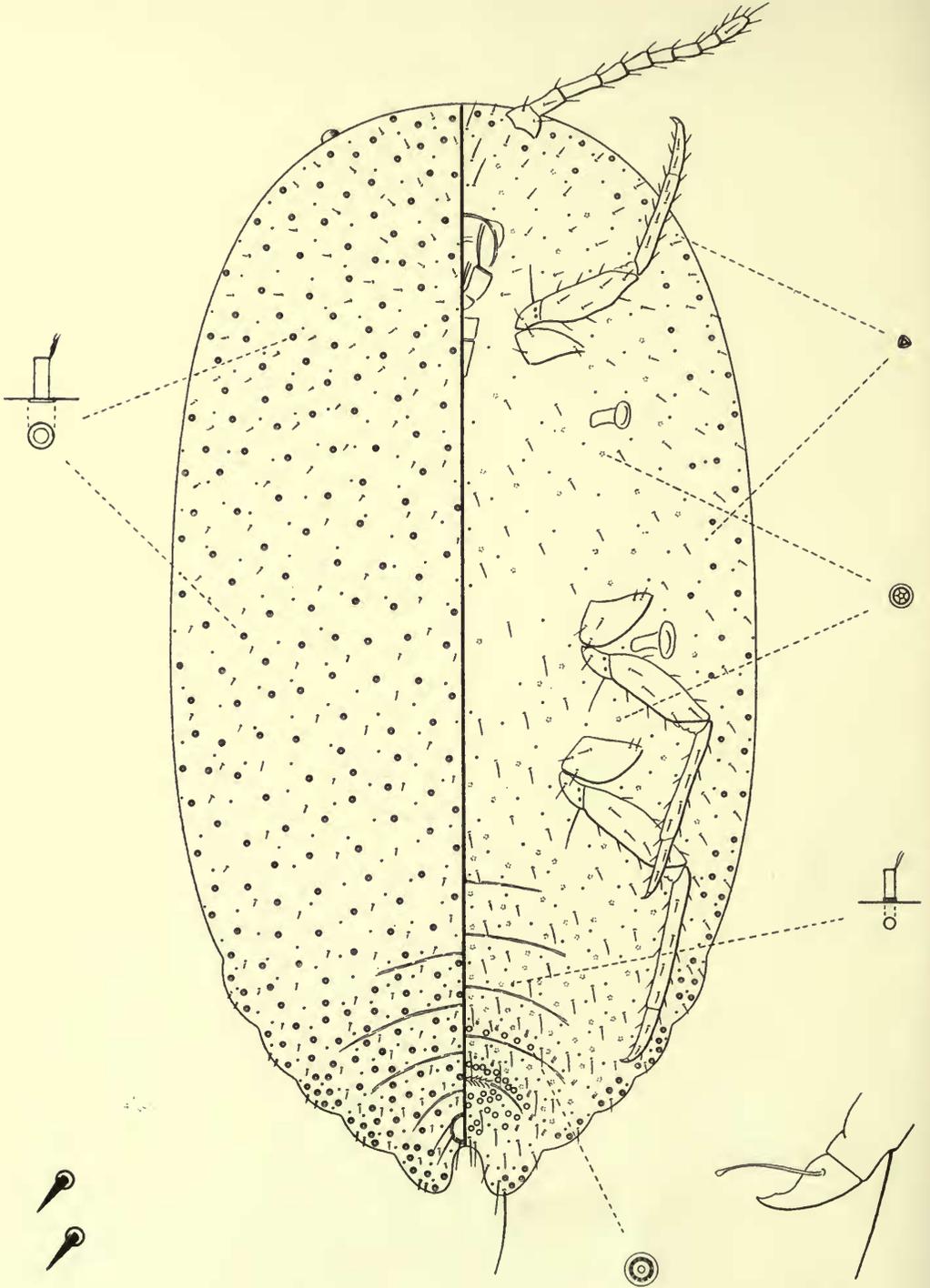


FIG. 12. *Pseudococcus nitidus* Brain

*Pseudococcus quaesitus* Brain

(Text-fig. 13)

*Pseudococcus quaesitus* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 123.*Pseudococcus elisabethae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 126 (SYN. NOV.).*Pseudococcus trichiliae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 131 (SYN. NOV.).

The material available consisted on one slide labelled: "larvae of *Pseudococcus quaesitus* Brain; Pretoria: Nov. 1914; larvae; 60, C.K.B."; another slide labelled: "♂ of *Pseudococcus quaesitus* Brain; Pretoria; ♂ paratype; ♂ 60; Nov. 16, 1914." Six more slides were marked with the serial number "60, C.K.B." one of which with larvae only; the remaining five slides contained altogether eleven old adult females. Three more slides with altogether nine old adult females bore the following data: "*Pseudococcus quaesitus* Brain; *Acacia horrida*; Grahamstown: Jan. 1899; dry material; 63".

"The ovisacs are often collected into masses which remind one of *Ps. filamentosus* Kll., but present a pinkish tinge rather than yellow or greyish. Seen singly as in cavities in tree-trunks, the ovisacs are usually more or less button-shaped, with straight vertical sides and a rounded top. The largest observed measured approximately 3 mm. in diameter . . . Adult female may reach 4 mm. in length, pinkish coloured at first and later purplish, with dense, white, powdery secretion. Lateral filaments short and fragile. Caudal filaments two in number, stout, may attain one third the length of the body." (Brain, *l.c.*). Body of mounted specimens elliptical. Margin of body with a series of seventeen pairs of cerarii. Anal lobe cerarii each formed by two conical spines surrounded by a small group of trilocular pores and a few slender auxiliary setae; area about spines not chitinized. Remaining cerarii each with two spines which tend to be noticeably more slender anteriorly. Each cerarius is associated with a grouping of a few trilocular pores but no auxiliary setae. Ventral side of each anal lobe with a robust apical seta, longer than those of anal ring; subapical seta very short; chitinized bar absent. Multilocular disc pores rather few and arranged in five groups on ventral side of last abdominal segments. The number of pores in one specimen was as follows: (v) 24; (vi) 19; (vii) 21; (viii) 29; (ix + x) 21. On segments anterior to genital opening they are set in transverse rows along distal margin. Tubular ducts with oral collar set in five or six small groups on ventral marginal area of abdomen. Tubular ducts with oral rim fairly numerous on dorsum and a few on venter on marginal and submarginal areas of thorax. Trilocular pores moderately numerous and uniformly distributed on both sides of body. Circular disc pores apparently absent. Dorsal setae short; ventral ones longer but slender, in either case not numerous. Anterior and posterior dorsal ostioles well developed with lips membranous having some trilocular pores and a few short setae. Circulus absent. Legs well developed, robust, with a few translucent pores on hind femur. Anal ring normal, with six setae. Antennae 8-jointed, at times with a pseudoarticulation on apical joint.

*Pseudococcus elisabethae* and *trichiliae* described by Brain in the same paper are synonyms of *quaesitus*.

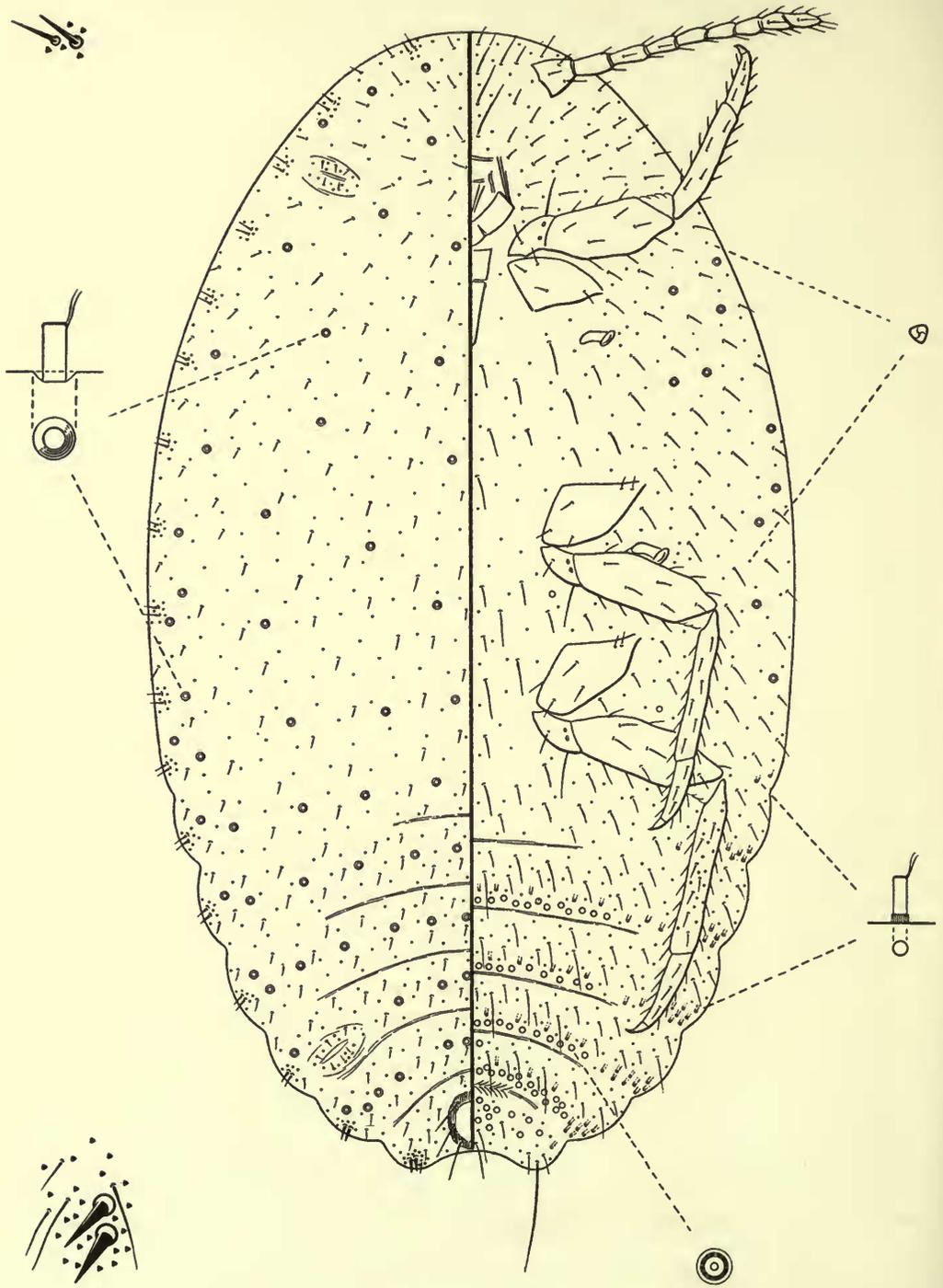


FIG. 13. *Pseudococcus quaesitus* Brain

*Pseudococcus segnis* Brain

(Text-fig. 14)

*Pseudococcus segnis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 145.

One slide with a single very old adult female in fairly good condition was made available from the U.S. National collection of Coccidae, Washington, D.C. It bore the following data: "*Pseudococcus segnis* Brain; Stellenbosch: 17.xii.1914; B. 55, C.K.B." Although the collecting data is not exactly the same recorded in Brain's paper, that is 13th December, 1914, the serial number is identical and we can assume that the specimen actually belongs to the original type series.

"Adult female: the four specimens range from 2.8 to 3.4 mm. in length, and are dark olivaceous-green in colour. There are no lateral or caudal filaments, and only a slight trace of white secretion, the insects appearing rather greasy or slug-like. This absence of secretion may be due to shaking in transit." (Brain, *l.c.*). Body elliptical with eighteen pairs of cerarii. Anal lobe cerarii each apparently formed by two spines<sup>1</sup> surrounded by eight to ten trilocular pores; auxiliary setae absent; area about spines not chitinized. Remaining cerarii each provided with two small and slender conical spines which on most anterior pairs are not differentiated from setae of dorsum. Each cerarius is beset by five to eight trilocular pores. Ventral side of each anal lobe without chitinized bar; apical seta about as long as those of anal ring; subapical one shorter. Multilocular disc pores, tubular ducts and circular disc pores entirely absent. Trilocular pores fairly abundant and uniformly distributed. Dorsal setae few and very small, spiniform; ventral setae also few but much longer. Anterior and posterior dorsal ostioles well developed, lips membranous with many trilocular pores and a few minute setae. Circulus absent. Legs normal with a denticle on claw; unguis and tarsal digitules apparently pointed; hind legs without translucent pores. Antennae 9-jointed.

*Pseudococcus socialis* Brain

(Text-fig. 15)

*Pseudococcus socialis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 103.

Three slides, one with ova and two with altogether three specimens in fairly good condition were seen. All were labelled: "*Pseudococcus solitarius* sp. n.; Pretoria, Union Buildings: 20.xi.1914; C.K.B.; on grass; C.K.B.; 52 B." Even in this instance the specific name under which the species was described does not agree with that originally assigned on the type slides. Nevertheless there were no doubts that the material belonged to *socialis* as all collecting data and serial number are exactly the same as this species referred to by Brain in his paper.

"Ovisac: an irregular mass of white cottony secretion, about 3 mm. in diameter . . . The adult female is elongate, of a purplish-brown colour, the whole body being slightly powdered with white. There were no signs of lateral or caudal filaments . . . The average size of female insects (containing ova) when mounted is 1.7 mm.

<sup>1</sup> In the specimens examined all cerarian spines of the anal lobes were broken away.

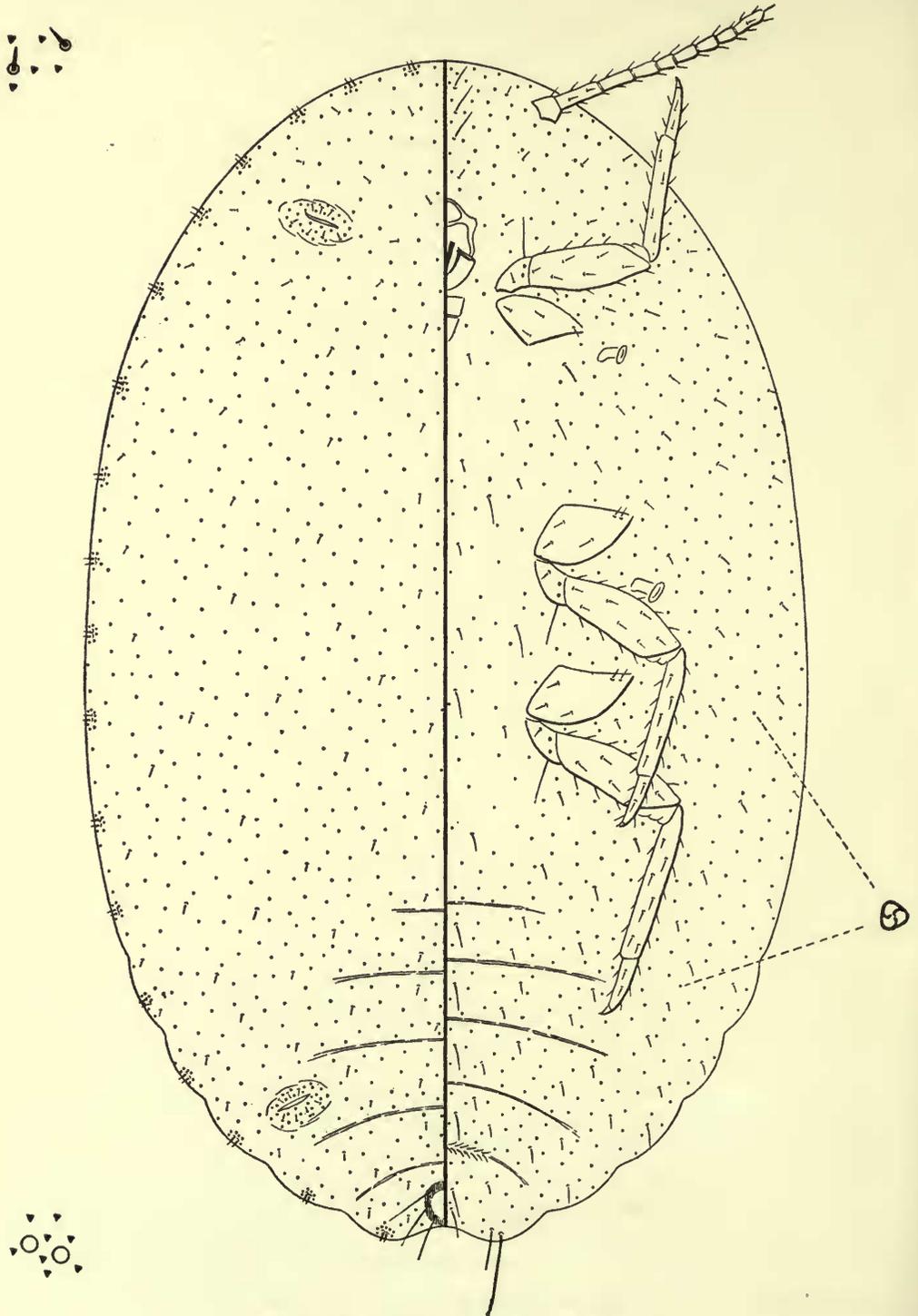


FIG. 14. *Pseudococcus segnis* Brain

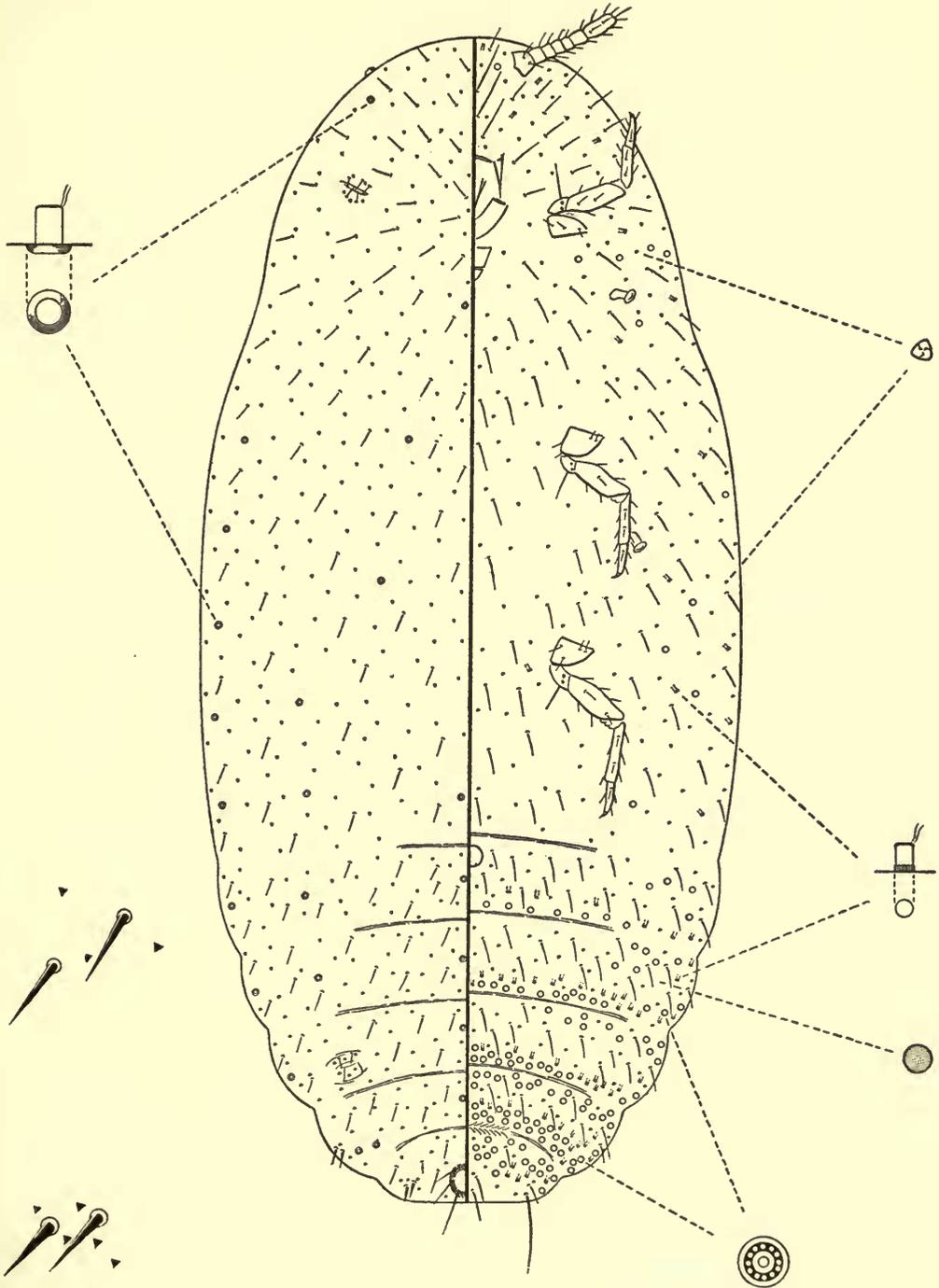


FIG. 15. *Pseudococcus socialis* Brain

long and 0.8 mm. broad." (Brain, *l.c.*). Body elongate elliptical, membranous. Marginal cerarii recognizable only on last two abdominal segments. Anal lobe cerarii each with two rather slender conical spines beset by a few trilocular pores; area about cerarian spines not chitinized; auxiliary setae absent. Preanal cerarii each with two spines more slender and set somewhat apart from each other, without grouping of trilocular pores or auxiliary setae. Ventral side of each anal lobe with a robust apical seta noticeably longer than those of anal ring; subapical seta much shorter; chitinized bar absent. Multilocular disc pores arranged in five groups on ventral side of last abdominal segments. The number of pores in one specimen was as follows: (v) 14; (vi) 35; (vii) 64; (viii) 75; (ix + x) 26. A few pores scattered on marginal and submarginal ventral areas of thorax and head. Dorsal tubular ducts with oral rim few. One occurring on median line of each abdominal segment (iv) to (viii); one on marginal area of each abdominal and thoracic segment; a few more widely scattered. Tubular ducts with oral collar set in transverse irregular rows on last abdominal segments in association with multilocular disc pores and a few widely scattered all over ventral side of body. Trilocular pores not numerous and evenly distributed all over body. Circular disc pores about same size as trilocular pores, having a granulate surface; they are few and apparently present only on ventral side of abdomen. Dorsal and ventral setae rather few, slender. Anterior and posterior dorsal ostioles not prominent but with lips membranous and with a grouping of a few trilocular pores and two to four minute setae. Circulus small, rounded, with border fairly highly chitinized, set near basal margin of fifth abdominal segment. Legs all short otherwise normal, with some translucent pores. Antennae short, built up with seven joints.

***Pseudococcus solitarius* Brain (= *Nipaecoccus vastator* (Maskell) (SYN. NOV.)**

*Pseudococcus solitarius* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 104.

Three slides containing altogether six specimens, all badly distorted and broken were examined. They bore the following label: "*Pseudococcus solitarius* sp. n.; Transvaal, Pretoria and dist.: Sept.-Oct. 1914; C.K.B.; on thorn tree; C.K.B., 65." Carefully examined this species was found identical with *Nipaecoccus vastator* (Maskell) with which it is synonymized.

***Pseudococcus stelli* Brain**

(Text-fig. 16)

*Pseudococcus stelli* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 146.

Of three slides seen, only one contained a single adult female in fairly good condition. It was labelled: "*Pseudococcus stelli* Brain; on *Borbonia cordata* Linn.; Stellenbosch: Dec. 17, 1914; paratypes; B. 56, C.K.B." The remaining two slides contained males, larvae and ova only.

"Ovisac: the ovisacs are rounded masses of cottony material . . . In form they appear almost spherical . . . The greatest diameter averages approximately 2.5 mm. . . . The adult female is pale canary-yellow in colour, about 2 mm.

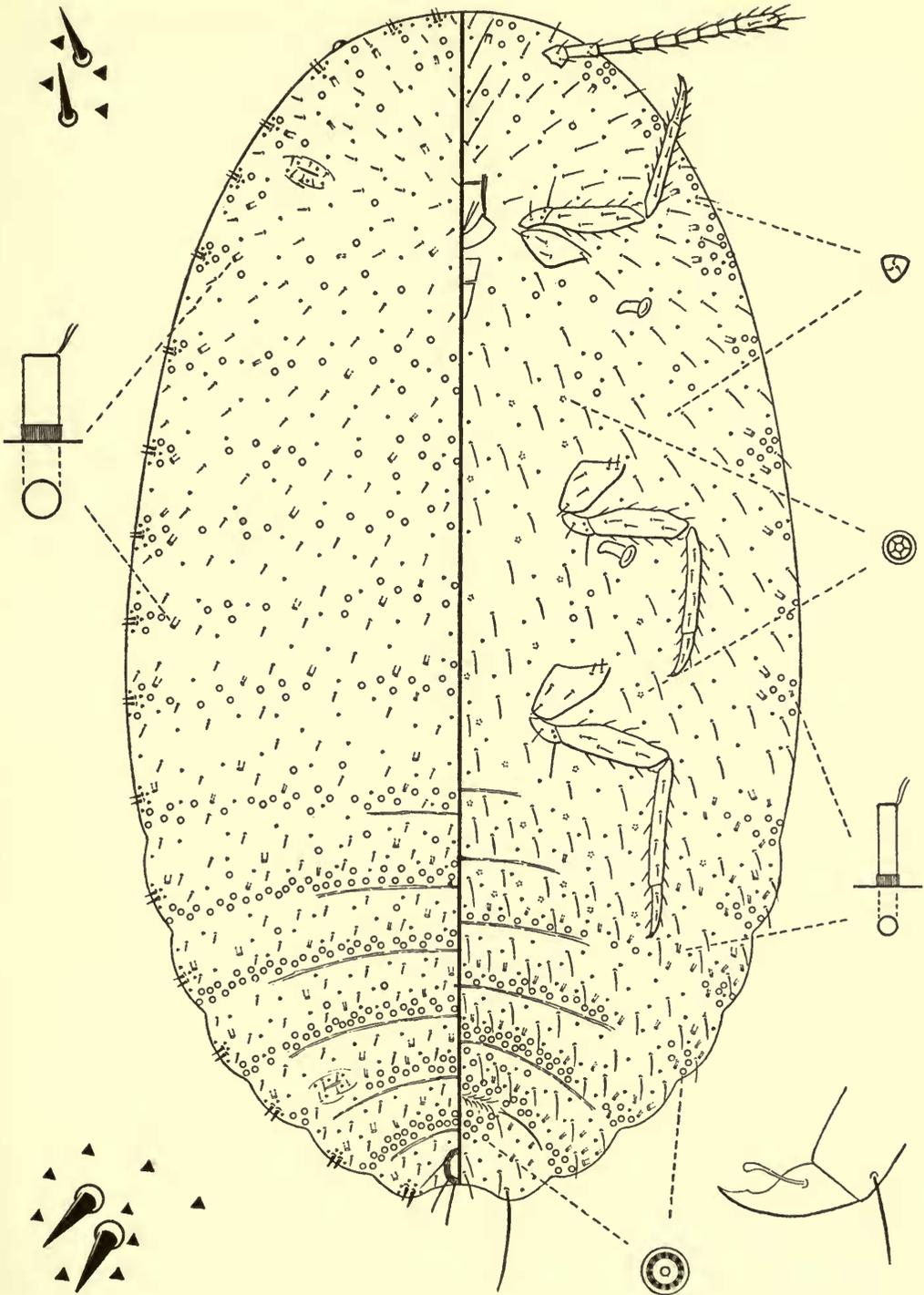


FIG. 16. *Pseudococcus stelli* Brain

to 2.5 mm. long. The lateral filaments are very short, but distinct and gradually increase in length posteriorly. The caudal ones, two in number, are also short, about twice as long as the next pair, stout at the base and tapering towards the tip." (Brain, *l.c.*). Mounted specimens elliptical, membranous. Margin of body with a complete series of eighteen pairs of cerarii. One of anal lobe cerarii was provided with two conical spines; opposite one with three; both surrounded by a group of a few trilocular pores; auxiliary setae missing; area about spines not chitinized. All remaining cerarii each formed with two spines more slender than those of anal lobe ones, beset by three to seven trilocular pores, without auxiliary setae. Ventral side of each anal lobe with a robust apical seta longer than those of anal ring; sub-apical seta much shorter; chitinized bar absent. Multilocular disc pores abundant on both sides of body, particularly so on dorsum; on abdomen they tend to be crowded in transverse segmental rows along distal margin of last segments. Quinquelocular pores rather few and scattered on median and submedian ventral areas of thorax and first two abdominal segments. Trilocular pores not numerous and evenly distributed. Circular disc pores apparently absent. Tubular ducts with oral rim entirely missing. Tubular ducts with oral collar of two sizes. Small ones rather few on ventral marginal area of all abdominal segments and in association with ventral abdominal multilocular disc pores. One—occasionally two—tubular ducts of large size occur on dorsal and ventral marginal areas near each cerarius; others are scattered all over dorsum. Dorsal setae very short; ventral ones much longer but slender; in neither case abundant. Anterior and posterior dorsal ostioles not prominent, with lips membranous having a cluster of a few trilocular pores and two to four small setae. Circulus may or may not be present because the area where normally it occurs was broken away on specimen examined. Legs all well developed, without translucent pores; claw with a small denticle; unguis short and knobbed apically; tarsal ones finely pointed. Antennae with nine joints.

***Pseudococcus stelli tylococciformis* Brain**  
(= ***Pseudococcus stelli* Brain**) (SYN. NOV.)

*Pseudococcus stelli tylococciformis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 149.

This variety was described on a few specimens collected on the same twigs as those attacked by *P. stelli* with which, according to Brain, they were identical except that they were smaller and the marginal cerarii were inserted on small tubercles a character peculiar to almost all species at the beginning of the adult stage. Although no types, paratypes or else could be seen, we definitely regard this variety as based on very young adult females of *stelli* with which it is here synonymized.

***Pseudococcus transvaalensis* Brain**

*Pseudococcus transvaalensis* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5 : 129.

*Trionymus sanguineus* James, 1936, *Trans. R. ent. Soc. Lond.* 85 : 197 (SYN. NOV.).

The material of this species examined was as follows: six slides one of which contained larvae and the remaining five with altogether nine specimens, all marked

with Brain's serial number "B. 46, C.K.B." Two other slides contained altogether three specimens marked with the serial number only "B. 47, C.K.B." Four more slides of which three with a single specimen and one with larvae, all labelled: "*Pseudococcus transvaalensis* Brain; roots of cornflower; Pretoria; 27.xii.1914; C.K.B.; B. 47a, C.K.B." In the original paper the collecting data of these specimens is reported as 28 Dec. 1914, which has to be explained as a pen slip made by Brain on labelling the slides.

All above listed material was carefully compared with specimens of *Trionymus sanguineus* James from Kenya and found structurally identical. The James species which has been redescribed and illustrated in our previous paper (De Lotto, 1957) has to be understood as a synonym of *P. transvaalensis* Brain.

### *Pseudococcus trichiliae* Brain (= *Pseudococcus quaesitus* Brain)

*Pseudococcus trichiliae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 131.

Three slides containing altogether six specimens labelled: "*Pseudococcus trichiliae* Brain; on *Trichilia* sp.; Durban, Natal; 27.x.1914; paratypes; B. 51, C.K.B." were seen.

This species is a synonym of *P. quaesitus* which Brain described in the same paper on an earlier page. All paratypes of *trichiliae* are large and very old adult females, structurally they cannot be differentiated from those of *quaesitus*.

### *Pseudococcus wachendorffiae* Brain

(Text-fig. 17)

*Pseudococcus wachendorffiae* Brain, 1912, *Ann. ent. Soc. Amer.* 5: 183.

Two specimens were examined. One was labelled: "*Pseudococcus wachendorffiae* Brain; paratype; on *Wachendorffia paniculata*; Newlands Flats: 3.x.1910; 53." The second bore the following data: "*Pseudococcus wachendorffiae* Brain; on *Wachendorffia paniculata* Lin.; Newlands Flats: 2.x.1910; paratype; 53." Both paratypes were distorted, partly broken and with many body setae missing.

"Ovisac: no definite ovisac was found, although where the adult female was situated a definite white granular patch of waxy secretion was noticed on the plant. Adult female: largest specimen found measured while alive 4.1 mm. long and 1.9 mm. broad. The body was finely covered with granular secretion, white, but segmentation was still conspicuous. Lateral appendages of wax were absent, but a short caudal tuft was generally noticeable." (Brain, *l.c.*).

Mounted specimens elongate elliptical, membranous. Cerarii confined to a single pair on anal lobes, each built up with two strong conical spines, beset by several trilocular pores and a few robust auxiliary setae; area about the spines not chitinized. Ventral side of each anal lobe provided with a long robust apical seta, longer than those of anal ring; subapical one much shorter; no chitinized bar. Multilocular disc pores in three groups on ventral side of last abdominal segments. The number of pores in one specimen was as follows: (vii) 15; (viii) 34; (ix + x) 26. On

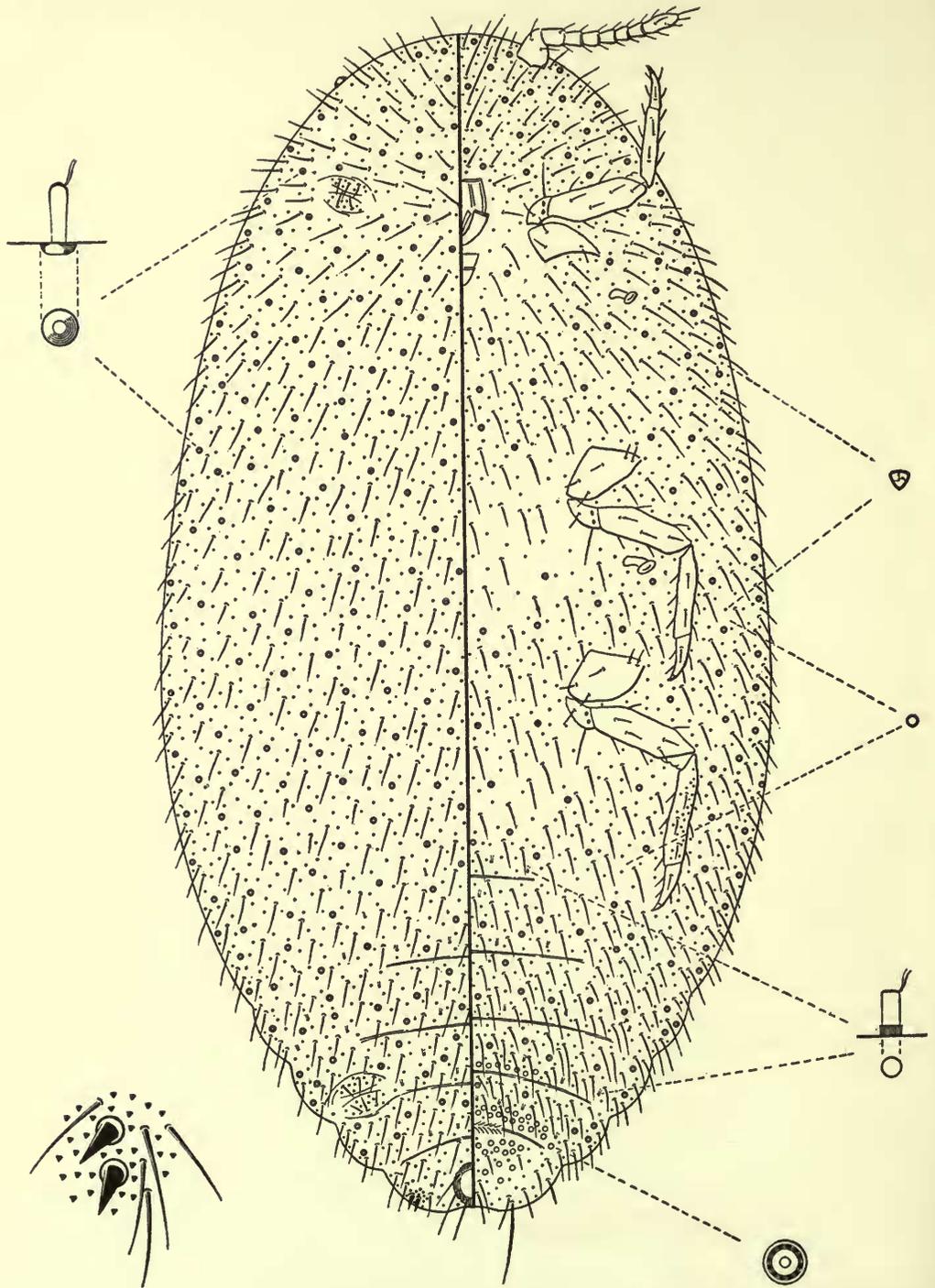


FIG. 17. *Pseudococcus wachendorffiae* Brain

segments anterior to genital opening they are arranged in transverse rows along distal margin. Trilocular pores numerous all over body. Circular disc pores smaller than trilocular pores and abundantly distributed on either side of body. Tubular ducts with oral rim very numerous on dorsum and venter, except on last abdominal segment where they are missing. Tubular ducts with oral collar few on ventral side of abdominal segments only. Dorsal and ventral setae very numerous and unusually long and robust. Anterior and posterior dorsal ostioles rather conspicuous, lips membranous having a cluster of a few trilocular pores and small setae. Circulus absent. Legs well developed; hind tibiae with numerous small translucent pores. Antennae with eight joints.

***Puto (?) africanus* Brain**

(Text-fig. 18).

*Puto (?) africanus* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 151.

One slide with two adult females in poor condition being very badly distorted was made available from the U.S. National Collection of Coccidae, Washington, D.C. The slide bore the following label: "*Puto africanus* Brain; on *Tamarix articulata*; Cape Town: Jan. 1898; paratype; B. 70, C.K.B."

"Adult female enclosed in a dense felted or papery sac, which is generally white or yellowish in colour . . . The ovisacs, when not deformed by massing together, are regularly elongate oval about 2 mm. long and 1.2 mm. in diameter . . . The adult female as recovered from dry material is merely a black shrivelled mass without indication of secretory covering of any kind, and without lateral or caudal filaments . . . In mounted specimens the body averages 1.7 mm. in length and 0.9 mm. breadth." (Brain, *l.c.*). Mounted females oval to broadly oval in outline, membranous. Marginal cerarii recognizable only on anal and preanal segments. Anal lobe cerarii each formed by two very robust spines, somewhat lanceolate in shape, surrounded by a loose group of a few trilocular pores and one or two fairly long stout auxiliary setae; chitinized area large and extending to ventral side. Preanal cerarii each with two spines of same shape and size as those of anal cerarii, beset by a few trilocular pores; auxiliary setae missing; area about spines not chitinized. Ventral side of each anal lobe provided with an apparently robust long apical seta<sup>1</sup> and two to four shorter ones. Multilocular disc pores present only on median and submedian ventral areas as far as prothorax, set widely apart from one another. Tubular ducts of two types. One type being rather long and slender without usual collar but the opening being instead surrounded by a small chitinized keel. These ducts occur on both sides of body, apparently without any particular pattern. Other ducts distinctly larger with a narrow rim occurring on dorsum only. Trilocular pores few. Circular disc pores larger than trilocular pores, not numerous and distributed all over body. Dorsal setae not numerous, fairly stout; a few on abdomen similar in shape and size to cerarian spines; ventral ones slender. Anterior dorsal ostioles not recognizable on specimens examined; posterior ones inconspicuous without setae or grouping of trilocular pores on their lips.

<sup>1</sup> Both missing in the specimens examined.

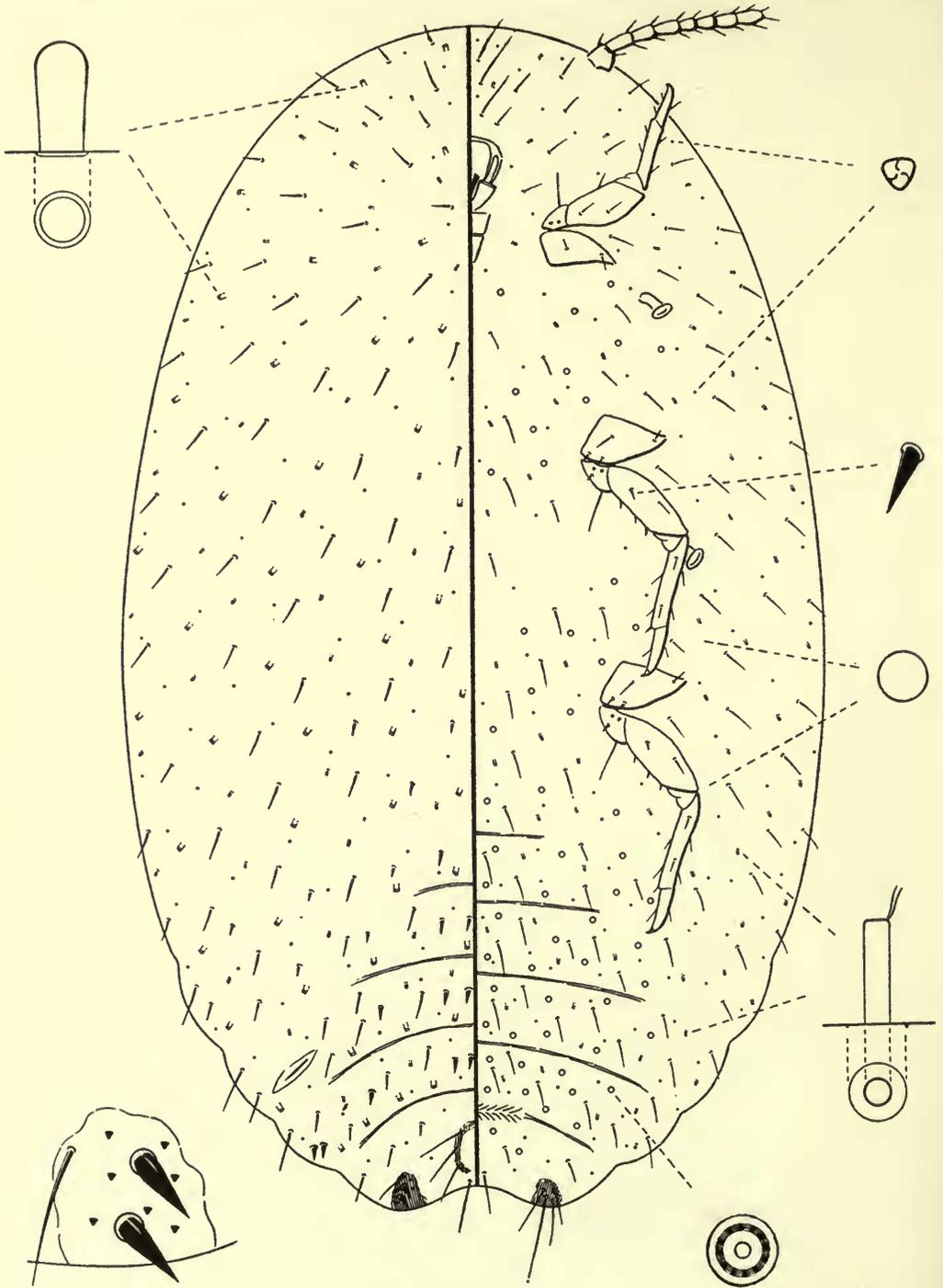


FIG. 18. *Puto africanus* Brain

Circulus absent. Legs normal; claw without denticle; hind legs without translucent pores; a few setae on median and hind legs stoutly spiniform. Anal ring of usual Pseudococcid type, opened posteriorly, with six robust setae.<sup>1</sup> Antennae with eight or nine joints.

***Rhizoecus africanus* Brain (= *Rhizoecus falcifer* Kuenckel)**

*Rhizoecus africanus* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 89.

Three slides containing altogether seven adult and two preadult females were seen. They were labelled: "*Rhizoecus africanus* Brain; roots of plants; Cape Town: Feb. 1906; paratype; 62."

Brain's paratypes were compared with the redescription and figure of *R. falcifer* Kuenckel recently published by Ferris (1953) and our conclusion fully agrees with Hambleton's opinion (1946) that the Brain species is a synonym of *falcifer*.

***Tylococcus chrysocomae* Brain**

(Text-fig. 19)

*Tylococcus chrysocomae* Brain, 1915, *Trans. roy. Soc. S. Afr.* 5: 93.

The material examined was represented by four slides with altogether eight specimens, all old adults partly distorted, labelled as follows: "*Tylococcus chrysocomae* sp. n.; Grahamstown: 4th March 1915; A. Kelly; on *Chrysocoma tenuifolia*; C.K.B., 61."

"Ovisac: white, dense, elongate oval, may reach 5 mm. long and 2 mm. in diameter. The ovisac may be single or clustered. The adult female is found at one extremity of the ovisac and often appears as though partly enclosed owing to the median dorsal keel of white secretion . . . When cleared, stained, and mounted, the adult female is 2 mm. to 2.5 mm. long." (Brain, *l.c.*). Body of mounted specimens very broadly elliptical, nearly circular; membranous. Margin of body with cerarii reduced to sixteen or seventeen pairs owing to absence of one or two pairs on thorax. Cerarii on head and last abdominal segments tending to be inserted in a small very broadly rounded prominence. All cerarii formed by two to four robust conical spines, without any grouping of trilocular pores or auxiliary setae; area about spines not chitinized. Ventral side of each anal lobe with a stout apical seta about same length as those of anal ring; subapical one much shorter; chitinized bar absent. Multilocular disc pores fairly numerous on either side of body, distributed without any regular pattern. Quinquelocular pores not abundant and scattered on dorsum and venter. Tubular ducts somewhat departing in their structure from those normally found in Pseudococcidae. They are provided neither with oral rim nor oral collar, the opening being instead surrounded by a small circular chitinized keel, similar to those seen in *Puto* (?) *africanus*. They occur abundantly on both sides of body. Trilocular pores few but evenly distributed, circular disc pores apparently absent. Ventral setae rather short and slender; dorsal ones about same

<sup>1</sup> The two setae posterior to the anal ring actually do not belong to it, as Brain stated. They are the cisanal setae which in this species lie unusually close to the anal ring.

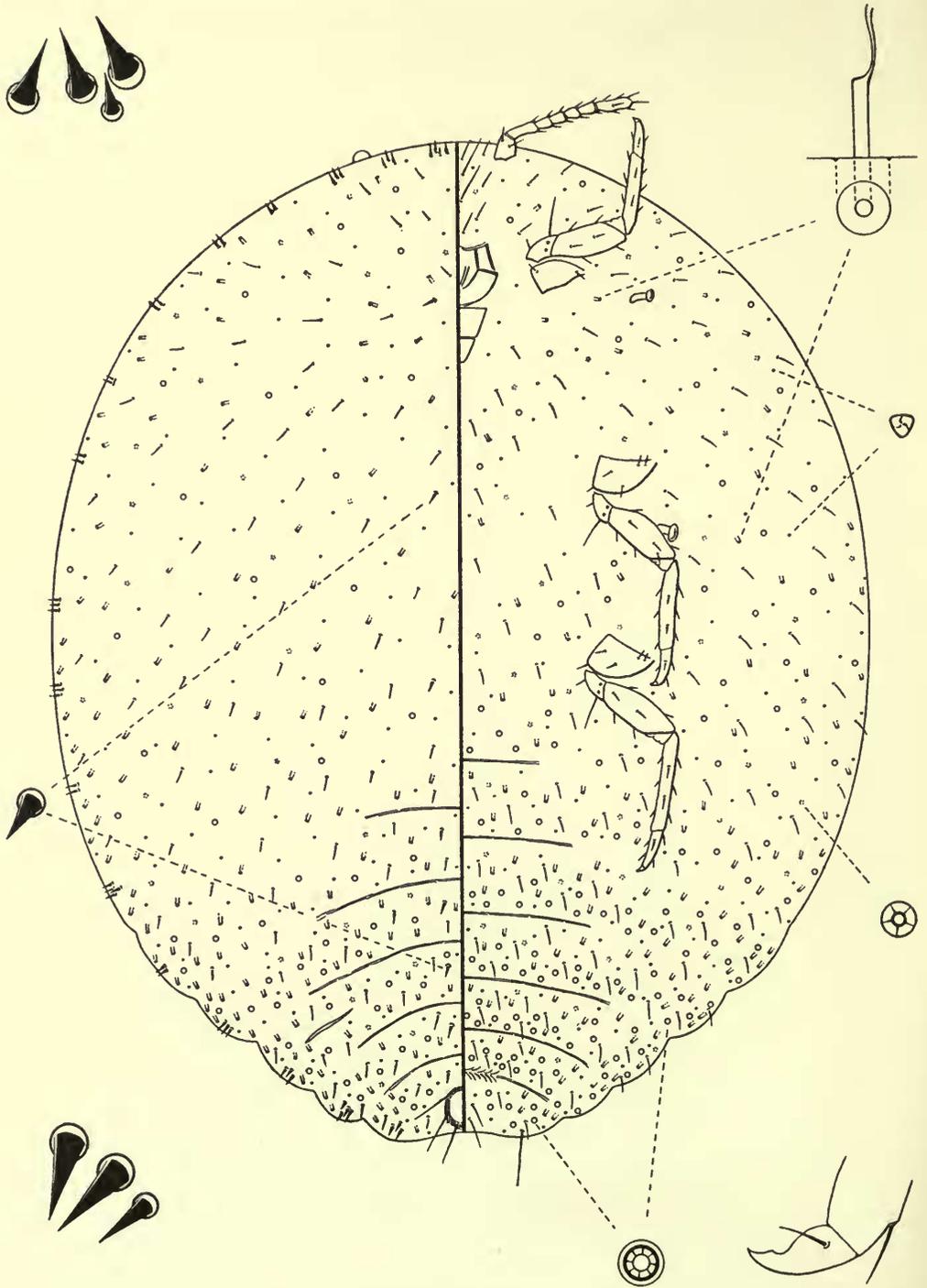


FIG. 19. *Tylococcus chrysocomae* Brain

length but robust; a couple of stout spines similar to those of marginal cerarii occur on median area of thoracic and abdominal segments. Anterior dorsal ostioles not recognizable; posterior ones very poorly marked. Circulus absent. Legs well developed, without translucent pores on hind pair; claw with a small denticle; unguis and tarsal digitules short and finely pointed. Antennae normally 7-jointed; but in one specimen one antenna had seven joints, the other eight.

## SUMMARY

The author deals with the identity of the Pseudococcidae described from South Africa by C. K. Brain. Twenty-two species are retained as valid and are redescribed or reviewed. Four species and one variety are synonymized in the course of the paper.

## ACKNOWLEDGMENTS

We wish to convey our sincere thanks to Dr. T. J. Naude, Chief Entomologist, Department of Agriculture, Pretoria, South Africa, for his permission to carry out the examination of all Brain's typical material stored in the Division of Entomology; to Dr. H. Morrison, Senior Entomologist, U.S. Department of Agriculture, Washington, D.C., who made available slides of four species apparently missing in Pretoria. Sincere thanks are also due to Dr. W. J. Hall, Director, and to Dr. D. J. Williams, Entomologist, Commonwealth Institute of Entomology, London, for their invaluable help connected with some bibliographical references. Our sincere thanks are particularly extended to Dr. H. K. Munro, Department of Agriculture, Pretoria, for his kindness and assistance given during our visit to South Africa and in whose laboratory the main part of the present work was carried out.

We are greatly indebted to Dr. R. H. Le Pelley, Senior Entomologist, Department of Agriculture, Kenya, who as usual undertook the task of going through the manuscript, suggesting valuable amendments.

## REFERENCES

- BRAIN, C. K. 1912. Contribution to the knowledge of Mealy Bugs, genus *Pseudococcus*, in the vicinity of Cape Town, South Africa. *Ann. ent. Soc. Amer.* 5: 177-189.  
 — 1915. The Coccidae of South Africa, I. *Trans. roy. Soc. S. Afr.* 5: 65-194.  
 — 1918. The Coccidae of South Africa, II. *Bull. ent. Res.* 9: 107-139.  
 DE LOTTO, G. 1957. The Pseudococcidae (Homopt. : Coccoidea) described by H. C. James from East Africa. *Bull. British Mus. (Nat. Hist.) Ent.* 5: 183-232.  
 ESSIG, E. O. 1942. *College Entomology*, pp. vii + 900, McMillan Co., New York.  
 EZZAT, Y. M. & MCCONNELL, H. S. 1956. A classification of the Mealybug Tribe Planococcini (Pseudococcidae, Homoptera). *Bull. agric. exp. Stn., Univ. Maryland*, A-84, pp. 108.  
 FERRIS, G. F. 1918. The California species of Mealy Bugs. *Stanf. Univ. Publ.* pp. 78.  
 — 1948-50. *Atlas of the Scale Insects of North America*, vols. v and vi, Stanford Univ. Press.  
 GREEN, E. E. 1915. Observations on British Coccidae in 1914 with descriptions of new species. *Ent. mon. Mag.* 51: 175-185.

- HALL, W. J. 1937. Observations on the Coccidae of Southern Rhodesia. VIII. *Trans. R. ent. Soc. Lond.* **86** : 119-134.
- HAMBLETON, E. J. 1946. Studies of hypogeic Mealybugs. *Rev. Ent.* **17** : 1-77.
- JAMES, H. C. 1933. Taxonomic notes on the Coffee Mealybugs of Kenya Colony. *Bull. ent. Res.* **24** : 429-436.
- 1936. New Mealybugs from East Africa. *Trans. R. ent. Soc. Lond.* **85** : 197-216.
- JOUBERT, C. J. 1928. *Pseudococcus gahani* Green, in South Africa. *Bull. ent. Res.* **29** : 209.
- MORRISON, H. 1945. The Mealybug Genus *Heterococcus* and some of its relatives (Homoptera : Coccoidea). *J. Wash. Acad. Sci.* **35** : 38-55.
- WILLIAMS, D. J. 1958. The Mealybugs (Pseudococcidae : Homoptera) described by W. M. Maskell, T. D. A. Cockerell, R. Newstead and E. E. Green from the Ethiopian Region. *Bull. Brit. Mus. (Nat. Hist.) Ent.* **6** : 205-236.
- ZIMMERMAN, E. C. 1958. *Insects of Hawaii*, vol. 5 : Homoptera Sternorhyncha, pp. 464, Honolulu, Univ. Hawaii Press.

